BUREAU OF HYGIENE AND TROPICAL DISEASES.

TROPICAL DISEASES BULLETIN.

Vol. 26.] 1929. [No. 1

MALARIA.

SEAGAR (E. Aitken). **Malaria in Barbados. Report and Comments.**—*Jl. Port-of-Spain Med. Soc.* 1927. pp. 12–18. With 2 plates.

Seagar returns to the question of malaria in Barbados. Unless men and money are forthcoming there will be a serious spread. He has been told that reliance should be placed on (1) swatting mosquitoes as advised by JAMES "seemingly based on the experimental work on *Anopheles maculipennis* in England," (2) on quininization. He points out the difference in conditions and the proved inutility of prophylactic quinine as an exterminator of infection. [The recommendation to attack anopheles in the house comes from the League of Nations Commission and no doubt Colonel JAMES was largely instrumental in the instigation of a scheme which makes the destruction of malaria a matter of personal interest to every housewife.] Seagar again urges that every possible means must be used wholeheartedly against malaria in Barbados.

Clayton Lane.

SEAGAR (E. A.). [**Malaria in Barbadoes.**] [Correspondence.]—*Jl. Trop. Med. & Hyg.* 1928. May 1. Vol. 31. No. 9. p. 112.

ALLEYNE, Port Health Officer of Barbadoes, being of opinion that anopheles had always been present in Barbadoes but eluded discovery, Seagar points out that LOW failed to find them in 1901; BALLON, entomologist, has equally failed during seventeen years' investigation. When Seagar himself made his first malarial survey in November, 1927, all breeding was in temporary pools, the nearest water to the schooner moorings. Two or three months later a second visit showed infection of permanent water and breeding going on right across the island. Had BALFOUR'S suggestion of trap pools, made many years ago, been accepted this amazing epidemic would have been prevented.

C. L.

PORTO RICO REVIEW OF PUBLIC HEALTH & TROPICAL MEDICINE. 1927. July. Vol. 3. No. 1. pp. 26–31.—**Studies of the Malaria Problem in Porto Rico. Distribution of Malaria. Paper XIII.**

——. 1927. Aug. Vol. 3. No. 2. pp. 68–70.—**Studies of the Malaria Problem in Porto Rico. Summary of Studies on Malaria Incidence. Paper XIV.**

The local incidence of malaria is described as having a history index of 2, a spleen index of 12·6 and a parasite index of 23. The percentage

of the various species of plasmodium in the last index varied thus: *P. vivax* 63 to 81, *P. falciparum* 14 to 36, *P. malariae* 0 to 12·8. *A. albimanus* is believed to be the chief vector.

C. L.

CLARK (H. C.). **Spleen and Parasite Rates as Measures of Malaria in the Caribbean Area.**—*Sixteenth Ann. Rep. Med. Dept. United Fruit Company Boston, Mass.* 1927. pp. 86–100. [9 refs.] [United Fruit Co. Med. Dept., New York, N.Y.]

Clark has examined spleens for their enlargement, seeing how desirable it is to detect as nearly as possible all malaria-infected individuals, and compared the result with BARBER and KOMP's comb method of staining Ross's thick films [see this *Bulletin*, Vol. 22, p. 405]. His experience falls in with that of others, that an enlarged spleen is no evidence of a present condition of obvious plasmodium carrying. Its use in a malarious country, where kala azar is not significant, as a means of determining the relative incidence of malaria in different areas, is not touched on by Clark and is not, of course, at the present time a matter for discussion. He puts the weight of the normal spleen in negroes at 140 to 160 gm. and believes that in them it must exceed 300 gm. before palpation is reasonably successful in detecting it.

C. L.

LEGENDRE (J.). Le paludisme chez les Européens en Haute-Volta. [**Malaria in Europeans in Upper Volta.**]—*Bull. Soc. Path. Exot.* 1928. Mar. 14. Vol. 21. No. 3. pp. 207–209. [1 ref.]

Legendre has seen only 11 cases of malaria, microscopically established, among 800 Europeans in Haute-Volta in 26 months. All but one had taken quinine prophylactically in doses of $\frac{1}{4}$ to $\frac{1}{2}$ gram, as is the rule among Europeans there. He holds that influenza and dengue are essentially responsible for the local fevers. In discussion RIGOLLET pointed out the effects on parasitic diagnosis of prophylactic quinine, and LEGER noted that in smears forwarded to Dakar from the Public Health Service of Haute-Volta the parasite index varied from 46·6 to 100 per cent.

C. L.

LEGENDRE (J.). Le paludisme chez les indigènes en Haute-Volta. [**Malaria in Natives in Upper Volta.**]—*Bull. Soc. Path. Exot.* 1928. Apr. 18. Vol. 21. No. 4. pp. 309–312. [1 ref.]

Legendre notes that among the natives there is a spleen index varying from 0 to 36, but that a clinical diagnosis of malaria in those who attend dispensaries is perhaps 2 per cent. This severance of spleen rate from clinical diagnosis he records as signifying a severance of association between malaria and splenomegaly, while even in this clinical diagnosis fever in 90 to 95 per cent. of cases is caused by influenza or dengue. He believes that when exact diagnosis [which admittedly he has not used] has reduced the incidence of malaria to its proper level, it will be found that quinine has been as effective in preventing malaria as has been the carrying of umbrellas in producing the aridity of the Sahara.

C. L.

SERGENT (Edm. & Et.), PARROT (L.), FOLEY (H.), CATANEI (A.) & SENEVET (G.). Etudes épidémiologiques et prophylactiques du paludisme, 23e, 24e et 25e campagnes en Algérie en 1924, 1925 et 1926. [**Epidemiological and Prophylactic Studies of Malaria in Algeria.**]—*Ann. Inst. Pasteur.* 1928. July. Vol. 42. No. 7. pp. 782–790.

Anopheles began ovipositing as early as January in 1926, the temperature being unseasonably high, and breeding-places were unusually numerous in 1924, rains failing and streams becoming mere strings of pools. Distinction is drawn between the ordinary splenic index and the splenometric index obtained by multiplying the former by a number representing the average degree of hypertrophy of the spleen. That springtime appearance of anopheles larvae is not due to persistence of eggs from the previous autumn is a conclusion almost compelled by the torrential character of the local streams in winter. Quinine tablets have been issued to 11,000, 12,000 and 13,500 persons in the 3 years respectively. Where malaria is treated, infection is decreasing and 8 villages have been rendered healthy.

C. L.

ENCISO (Angel). Contribucion al estudio del paludismo en el Rif. [**Contribution to the Study of Malaria in the Rif.**]—*Med. Países Cálidos.* Madrid. 1928. Sept. Vol. 1. No. 5. pp. 428–439. With 2 figs., 1 chart & 4 plates. French summary p. 439.

Of 298 blood examinations made, *P. vivax* was identified in 80, *P. malariae* in 18 and *P. falciparum* in 37. In 34 there was doubt as to the species and in 2 infection was mixed. *A. maculipennis* was concerned. Some infections were identified as being by *P. tenue.* Treatment was by 600 intravenous injections of quinine hydrochloride, 0·5 gm., given without inconvenience and associated with oral administration. Where quinine by any route has excited vomiting, intravenous injection of methylene blue, 0·05 gm. in 5 cc., has been followed by disappearance of vomiting and the possibility of continuing quinine treatment.

C. L.

IYENGAR (M. O. T.). **Govt. of Bengal, Report on the Malaria Survey of the Environs of Calcutta.**—97 pp. With 18 figs. & 1 sketch map. 1928. Calcutta. [Re. 1–6; 2s. 3d.]

—— & SUR (Panchanan). **Govt. of Bengal. Public Health Dept. Report of the Field Malaria Observatory at Sonarpur during 1921-1925.**—36 pp. With 13 charts & 1 map. 1928. Calcutta.

Four years ago there was a great demand for the building of houses about Calcutta and the report covers 4 years' close local work to determine the most suitable direction in which the city should expand. Spleen rates have shown that the low-lying areas are healthy and the higher ones, namely, the river banks, gravely malarious. [There is thus repeated in detail what is so evident for the gangetic delta as a whole.] The choice then lies between on the one hand acceptance of conditions and building on a low area flooded annually and on the other the selection of higher ground which shall be dealt with antimalarially. It is pointed out that the drying of the low levels by

drainage is a most difficult matter with an annual rainfall of 63 in. [and there seems no evidence that it would be antimalarially successful] and that reclamation of land and increase of population without deliberate antilarval work have already brought down malarial incidence to a low figure in certain riverside areas. A tract of land south of Calcutta is selected as the most suitable for the city's extension.

C. L.

STRICKLAND (C.), assisted by CHOWDHURY (K. L.) & in collaboration with DODDS-PRICE (J.), FORSYTH (C. E. P.), SMITH (Hugh), MURPHY (R. A.) & WILLIAMS (D. P.). **Abridged Report on Malaria in the Assam Tea Gardens with Pictures, Tables and Charts.**—128 pp. With 26 figs. & 3 plates. [26 refs.]

This well illustrated report, written for the Indian Tea Association, has a sting resulting evidently from obstruction by persons some of whom at least from the context seem to be medical. The investigation, carried out with striking completeness, originated in a suggestion by McCombie YOUNG taken up by Col. MEGAW of the Calcutta School of Tropical Medicine and the Indian Tea Association. Matters of wide interest are that season does not appreciably influence the spleen or haemoglobin indices, but does affect the parasite index. Anopheles are markedly seasonal as follows : Winter—*gigas, fuliginosus, hyrcanus* (=*sinensis*) and less so *maculatus* ; Spring—*maculatus, culicifacies, vagus* and less so *barbirostris* ; rains—*barbirostris, kochi, tesselatus* and less so *hyrcanus* and *vagus* and probably *umbrosus* ; Autumn—*umbrosus, hyrcanus* and less so *kochi, tesselatus, fuliginosus, maculatus* and *vagus*. Malaria case incidence is greatest in September or October. The spleen index in garden-born and immigrant children very shortly becomes the same. The recommendations stress the importance of site selection and the ridiculous situation which has arisen because of neglect to consult an expert. It points out the localness of malaria; " We do not subscribe to the view of the mugwumps that one can do nothing on an estate if neighbours will not co-operate." It urges the vital necessity of species sanitation and of working out from a centre. Finally, with an amusing but scarcely fair cynicism, one of the Report's conclusions is that the reason for the neglect of such matters " lies in the fact that Sir Ronald Ross made his great discovery here."

C. L.

COVELL (G.). **Malaria in Bombay, 1928.**—pp. v+113. With 4 maps & 1 chart. 1928. Bombay : Govt. Central Press. [Re. 1 As. 8 or 2s. 6d.]

It is impossible to give an adequate abstract of this publication and of the thorough work which underlies it. The spleen and parasite rates of Bombay are extremely patchy, the latter being as low as 5 and as high as 49 in different parts. Here malaria is carried by *A. stephensi* ; it is exclusively man-made, this mosquito breeding only in cisterns, tanks, fountains and wells. The closing of wells, screening of cisterns and treating of mill-ponds with Paris green are essential for eradication. The problem can be solved only by placing the whole area under a whole time special Malaria Officer of the Municipality, by legislation which gives him adequate powers, and by his ability to carry with him the officers of the various local bodies, Government Departments,

Railways, Mills, as well as the Municipality itself. "Without this co-operation no antimalarial scheme in Bombay can possibly succeed." As to the future, comment must insist, as indeed Covell does, that had BENTLEY's proposals of 17 years ago been properly carried out malaria would not be for Bombay the grave and increasing handicap which, in fact, it is.

C. L.

SARCAR (Sarasi Lal). **Flood and Flush Schemes—Ancient and Modern—with Reference to the Site of the Ancient City of Gour, Malda District, Bengal, and to the Incidence of Malaria.**—*Indian Med. Gaz.* 1927. Apr. Vol. 62. No. 4. pp. 188–195. With 1 plan.

The ancient city of Gour had, Sarcar believes, a system of flood and flush the failure of which caused its extermination by malaria. The proposal was to restore this, but there was strong opposition by big landholders who have planted profitable mango orchards on the higher lands.

But in 1922 "the people of the locality, being educated by propaganda work to save themselves from death and destruction by the ravages of such epidemic diseases as malaria and kala-azar, stealthily cut the Lohagora bundh during the night. There was thereby a flow of flood water through a portion of the non-flooded area within the bundhs. This appeared to have a marked effect in improving the health of the locality. The cut portion of the bundh was not subsequently closed, owing to strong public opinion, and probably also because the landholders and zemindars who were in opposition found that they suffered no financial loss."

The results of spleen census before and after are tabulated.

C. L.

COVELL (G.). **Report of an Inquiry into Malarial Conditions in the Andamans.**—28 pp. With 2 maps. 1927. Delhi: Govt. of India Press.

The outstanding feature of malaria in the Andamans is its extreme localization; all old-established villages situated half-a-mile or more from salt swamps are healthy, often with a spleen rate of 0; those situated close to these are highly malarious with a spleen rate up to 50. The essential carrier is *A. ludlowi* breeding in these swamps. Covell fully confirms CHRISTOPHERS' conclusions and advice given in 1911. Where the latter has been followed and sites moved there has been striking success; where it has been neglected, disaster. It is estimated that of the negrito aborigines in the Great Andaman only 120 survive; the few examined had a high spleen rate.

C. L.

BOREL (M.). Enquête malariologique à la station d'essai de Giaray (Cochinchine). [**Malarial Investigation in Cochin China.**]—*Bull. Soc. Path. Exot.* 1928. Apr. 18. Vol. 21. No. 4. pp. 312–314.

This spot was investigated in December. 20 per cent. of those examined were infected with one or other of the three malaria parasites, thick drop examination being used and there being present in one case 1,500 plasmodia in 20 fields. No anopheles were found in the houses and inhabitants held that they were rare; but the silence of the attack

of the nocturnal anopheles is stressed. 500 metres from the houses *A. barbirostri*, *A. aconitus*, *A. minimus* and *A. fuliginosus* were found breeding and were later bred out, while in similar country near by *A. maculatus* is found during the rains.

C. L.

O'Flynn (J. A.). **Incidence of Malaria at H.M. Naval Base, Singapore.** —*Jl. Roy. Nav. Med. Serv.* 1928. July. Vol. 14. No. 3. pp. 178–187. With 1 chart.

O'Flynn in the main covers the same ground as did Given (this *Bulletin*, Vol. 25, p. 911). The matters on which special stress is laid are the following: (1) The engagement of healthy coolies; (2) hookworm treatment which is believed to have been important in maintaining the general health although, in the absence of indication as to the diagnostic method used, the incidence cited must be accepted with caution; (3) proper housing and sanitation, the floors being 6 to 8 feet above the ground and each coolie being allotted a marked area of floor space; (4) isolation from native communities, which proved a difficult matter, mosquitoes even crossing the Straits from Johore; (5) early and efficient treatment, a matter dealt with in considerable detail; (6) anti-mosquito measures, the general basis of all.

C. L.

Kligler (I. J.). **Further Studies on the Epidemiology of Malaria in Palestine.**—*Amer. Jl. Trop. Med.* 1928. Mar. Vol. 8. No. 2. pp. 183–198. With 6 figs. [1 ref.] [Dept. of Hygiene, Hebrew Univ., Jerusalem.]

This paper deals with data collected during 1925. Climate in Palestine limits the spread of malaria not only in the cold of winter, although *A. elutus* has been found containing active sporozoits as late as January, but in the heat of summer which is inimical to that mosquito both as larva and imago. *A. sergenti* also is definitely implicated as a transmitter of sporozoits. *A. superpictus* has thus far disclosed oocysts only. Flight is considered as being of three grades, (1) a direct flight range of 2·5 kilometres (1·5 miles), (2) range of dispersion during the active breeding season 3·5 km., (3) range of dispersion during the hibernation flight, apparently as much as 8 km. There are two main malarial areas, the coast, where autumnal prevalence of anopheles is low and autumnal malaria is not epidemic, and the Jordan valley, where *A. elutus* is more easily controlled in the spring than *A. sergenti* in the autumn and where the autumn epidemic is the chief one.

C. L.

Amaret of Trans-Jordan Annual Report Department of Public Health for Year 1927. pp. 60–66.—**Reports on Malaria Survey in Trans-Jordan** submitted by Dr. W. K. Bigger, M.C., Senior Medical Officer, Samaria & Galilee Districts, Palestine. [Mimeographed Report received from Colonial Office, March 20, 1928.]

The valuable detailed reports are largely of local interest only, but the El Hammeh baths, for instance, visited by thousands of people

yearly, constitute a grave risk to Trans-Jordan, Palestine and Syria. In different parts spleen rates vary enormously with varying local conditions.

C. L.

FIGUERIDO (C. A.) & BILBAO (L.). Las primeras demostraciones de paludismo indigena en Vizcaya. [**Indigenous Malaria in Vizcaya, Spain.**]—*Med. Países Cálidos.* Madrid. 1928. Mar. Vol. 1. No. 2. pp. 153–160. With 5 text figs.

Malaria is shown to be endemic in the province of Vizcaya on the north coast of Spain. The cases considered comprise four children. Enlarged spleen and anaemia were clinical features. *P. vivax* was demonstrated in the blood of all of them. A blood-streaked mucous diarrhoea showed itself and it is questioned whether it might be evidence of malaria. Quinine treatment was oral, rectal, or "hypodermic," the last being without pain, inflammation, or sloughing.

C. L.

SOUTHERN MEDICAL JOURNAL. 1928. Sept. Vol. 21. No. 9. pp. 725–780. With 10 charts & 4 figs.—**Symposium on Malaria.** [DEEKS (Wm. E.), KRAUSS (William), BARBER (M. A.), WILLIAMS (L. L.) & LEGARE (A. E.), COOGLE (C. P.), CARLEY (Paul S.), COOK (S. S.) & WILLIAMS (L. L.), KOMP (W. H. W.), HERMS (W. B.), KING (W. V.), GRIFFITTS (T. H. D.), WETMORE (William O.), WELCH (S. W.), BAIR (M. Z.), ARMS (B. L.), MCCORMACK (A. T.), CLARKSON (L. M.), UNDERWOOD (Felix J.), HAYNE (James A.), BISHOP (E. L.), ANDERSON (J. C.), GRANT (H. G.), LEPRINCE (J. A.), JOHNSON (H. A.).]

This symposium consists of the papers read at Memphis, Tennessee, at a conjoint meeting of the National Malaria Committee and the Southern Medical Association at their 21st annual meeting. Only salient points can be indicated. Williams and Legare's observations indicate that larval control need not begin earlier than ten days prior to the date at which experience shows that adult control will become necessary, nor be continued more than two or three weeks after the other is due to cease. Barber instances tertian malaria endemic in New Mexico at 5,600 ft. and both tertian and subtertian at 3,800 ft. The disease has to be taken into account in the development of reclamation work in these arid regions. Cook and Williams report on Paris green dusting by aeroplane. The dilution advised for this purpose is 1 in 3, speed about 60 miles an hour, height 25 to 200 ft. according to velocity of breeze, quantity about 1 lb. of green per acre. Penetration of the local vegetation was good and larvicidal power striking. It is believed that one plane could cover 20 square miles a day. Komp described how larvae may be bred in numbers in a china cup provided ample food be provided in the shape of a scum of algae, infusoria and protozoa. Herms reports gambusia as suitable for a small percentage only of Californian breeding sites. In this region anopheles females show distinct spring and autumn migrations, two great annual flights. King deals with the adult anopheles density index and the necessity of obtaining comparable figures. For example, an anopheles which has fed remains in or near the banquet room—house or farm building—

during the following day. There must accordingly be collected preliminary figures to determine, first, the principal resting places, and, second, the approximate total abundance in each general type of shelter. If one type is selected for working out the density index, it must be one commonly present and commonly used. Griffitts considers salt marsh mosquitoes in the southern States. They have appeared in such hordes as to bring work to a standstill. *Aëdes sollicitans* is the most intolerable with *Aëdes taeniorhyncus* second and *Culex salinarius* a poor third. Yet on occasions *Anopheles crucians* may outnumber and out-bite the non-anophelines, ably helped by the intrepid *A. atropos* which breeds in water the salter the better. *Aëdes* eggs are laid on dried marshes and the advent of rain may activate the egg produce of months, so that billions of mosquitoes are simultaneously produced and, with proper temperature and humidity, may undertake a migration flight reaching 30 or 40 miles inland. Wetmore describes a conical weighted can, taking a natural upright position when thrown into deep water and leaking oil out slowly from the apex as water percolates in below it.

C. L.

DE VERTEUIL (Eric). **The Pitch Lake and Malaria.**—*Jl. Port-of-Spain Med. Soc.* 1927. pp. 30–44. With 4 charts & 6 figs. on 3 plates.

A résumé of 8 years' work already reported from time to time. A quarter of a mile between village and anopheline breeding ground experience shows to suffice, unless the latter is very extensive. An interesting point is the method of filling pools beside the pitch lake. If earth is thrown in, it gradually disappears into the viscous underlying pitch. If the earth at the bottom of the pool is removed, the pitch slowly oozes up and fills the pool.

C. L.

SUR (Panchanan). *Anopheles philippinensis* **as a Natural Carrier of the Malaria Parasites in Bengal.**—*Indian Jl. Med. Res.* 1928. July. Vol. 16. No. 1. pp. 45–47. [5 refs.]

The malaria research laboratory at Krishnagar (Nadia District), one of the places in Bengal which malaria has partly depopulated, shows that *A. philippinensis* was present and was a carrier during October 1927 to the extent of 1·6 per cent. of 125 specimens and during December to 5·1 per cent. of 98. "These figures are interesting as they are nearly the first definite records of infectivity of *Anopheles philippinensis* in nature."

C. L.

RUSSELL (Paul F.). *Plasmodium tenue* (**Stephens**). **A Review of the Literature and a Case Report.**—*Amer. Jl. Trop. Med.* 1928. Sept. Vol. 8. No. 5. pp. 449–479. With 1 fig. [72 refs.]

The writer has collected 72 references in the literature found in his own library or in this *Bulletin* and for this alone the paper will be consulted in future. A case is reported in which tenue forms appeared at intervals over sixteen months in a case infected with *P. vivax* and

P. falciparum. With Wright's stain Schüffner's dots were sometimes seen in infected cells. Fresh blood never showed any unusual amoeboid activity. Russell does not think the species a valid one.

C. L.

PICARD (F.). Les facteurs de répartition géographique du *Plasmodium vivax* et du *Plasmodium praecox.* [**Factors of Geographical Distribution of** *P. vivax* **and** *P. falciparum.*]—*C.R. Acad. Sci.* 1928. Feb. 20. Vol. 186. No. 8. pp. 549–551. [4 refs.]

In 1918 Picard suggested that the difference in geographical distribution of *P. vivax* and *P. falciparum* was explicable as the result of the optimum temperature at which the two species developed in the mosquito. This suggestion ROUBAUD turned down. Picard notes that he has now adopted it (this *Bulletin,* Vol. 25, p. 556).

C. L.

MACKENZIE (Ian). **Pathology, Prophylaxis and Treatment of Subtertian Malaria.**—*Amer. Jl. Public Health.* 1928. Aug. Vol. 18. No. 8. pp. 997–1002.

Examination of record cards of 1,150 cases of malaria shows a marked, progressive fall in haemoglobin at the beginning of an attack, with rapid recovery ordinarily, and fall in blood pressure, there being marked relationship between a low pressure and anaemia on the one side and localization of symptoms on the other. Other changes are as usual. Those who have undergone quinine prophylaxis (5 grains daily) are apt to have intense attacks of malaria and to react less satisfactorily to quinine, especially in first attacks. This quantity of quinine is insufficient where infected mosquitoes are many. It must then be doubled, a change which, when introduced in one locality, reduced the incidence by 40 per cent. Provided it is retained, quinine by mouth has been found as efficacious as by any other route.

C. L.

RUGE (Reinhold). Ein neues und ein altes Problem der Malariaforschung. [**A New and an Old Problem of Malarial Study.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. June. Vol. 32. No. 6. pp. 287–291.

The new problem concerns the statements of BARZILAI-VIVALDI and KAUDERS [this *Bulletin,* Vol. 22, p. 408] that a malaria strain transmitted by injection loses its capacity to form gametes. Ruge points out that FISCHER and MARTINI have infected *A. maculipennis* after 165 direct passages. The old problem is that of parthenogenesis of gametes ; perhaps this occurs rarely, since it has been reported by competent observers.

C. L.

HERRMANN (Otto) & MALININA (A.). Ueber die Dauer der Inkubation bei Malaria. [**Incubation Period in Malaria.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. Oct. Vol. 32. No. 10. pp. 506–510. [46 refs.]

A long incubation period for malaria is considered unestablished, and only to be determined by continued observations on artificially

induced malaria. JAMES having shown that infected anopheles kept at a temperature of 4° or 5° C. have infected 30 or 40 persons after several months, the question of a long latent period in man, extending over winter, requires reconsideration. Again under prophylactic quinine the first clinical evidence of malaria may really constitute a relapse, and even apart from this the first evidence may have been overlooked or attributed to something else.

C. L.

PINTO (Genserico de Souza). O indice esplenico, base do inquerito epidemiologico da malaria. [**The Splenic Index as a Base of Epidemiological Work in Malaria.**]—*Folha Med.* 1928. Aug. 25. Vol. 9. No. 24. pp. 286–289. With 1 text fig. [7 refs.]

Reference is made to the mass of informed opinion as to the value of the splenic index. The classification adopted is simple and a calculation in the nature of Christophers' " splen " is made, although an impalpable spleen is classed as equivalent for this purpose to a just palpable one. The rapidity and easiness with which the examination is made are pointed out, as well as the fact that it indicates " recent " malaria while the parasite index shows " present " malaria.

C. L.

PADUA (Regino G.). **Certain Sidelights on Malaria.**—*Jl. Philippine Islands Med. Assoc.* 1928. May. Vol. 8. No. 5. pp. 225–230. With 3 charts in text. [5 refs.]

The writer has found no relationship between parasite carriers (the method of examination not being here mentioned) and enlarged spleen. He refers to the Malaria Commission reports of the League of Nations in advocating the laying of greater stress on the treatment of infected persons than is at present being done in the Philippines.

C. L.

BIRD (W.). **The Effects of a Diet Rich in Sugar on the Relapse Rate in Chronic Benign Tertian Malaria.**—*Indian Jl. Med. Res.* 1928. July. Vol. 16. No. 1. pp. 109–114. [22 refs.]

Alternate cases of tertian malaria diagnosed by thick film were given : (1) 15 grains quinine sulphate in solution and with magnesium sulphate twice daily, (2) the same with 2 ounces of sugar once daily. In the first series 41 are reported with a relapse rate of 48·8 per cent. within eight weeks ; in the second series 28 with a similar relapse rate of about 70 per cent.

C. L.

HOPF (Gustav). Die Bedeutung von Blutgruppenkonstellation und Entwicklungsstadium der Plasmodien für Malariatyp und Inkubationszeit. [**The Significance of Blood Groups in Malaria.**]—*Muench. Med. Woch.* 1928. Oct. 12. Vol. 75. No. 41. pp. 1755–1756. [6 refs.] [Skin Clinic, Univ., Jena.]

The influence of blood groups on the carrying over from case to case of injected malaria (this *Bulletin*, Vol. 24, p. 754) has been further studied in 81 cases. It is concluded that with suitable groups the incubation period never exceeds 4 days; with unfavourable grouping

it exceeds this period unless the blood was taken 3 or 4 hours before the rigor, and the fever was quotidian. Yet these cases show a tendency to take on a tertian periodicity. It is believed that these findings denote damage to plasmodia when the host corpuscles agglutinate. He has found morula forms most common 4 hours before the rigor.

C. L.

i. JEAN (Langeron) & VAN NITSEN (R.). Le paludisme congenital. [**Congenital Malaria.**]—*Bull. Méd. du Katanga.* 1927. Dec. Vol. 4. No. 4–5 & 6. pp. 131–133.

ii. VALCKE (G.). Un cas de malaria congénitale.—*Ibid.* p. 133.

iii. JEAN (Langeron). La contamination paludéenne congenitale. Etat actuel de la question.—*Ibid.* pp. 133–138.

i. Of 8 children born dead, or dying shortly after, 6 showed schizonts in the spleen ; the two free from them were full-term babies, the others were born at months 5, 6, 6, 6, 8 and 9. Of 34 children born alive and with blood examined for the first time up to 12 days from delivery—the day of examination, the number examined, and the number infected were as follows : First day 4, 1 (and 2 more on the seventh day) ; second, 12, 8 (and 1 more on the eleventh day ; third, 4, 0 (but 1 later) ; fifth 6, 5 ; sixth, 1, 0 ; eighth, 1, 1 ; ninth, 2, 1 ; tenth, 2, 1 ; twelfth, 2, 1.

A postscript adds that, while in all cases the blood of both mother and child was examined and in 14 *Mf. perstans* was present in that of the mother, in no case was it found in the baby. It is, then, concluded that it is not by placental haemorrhages that foetal malarial infection occurs.

ii. A child born on May 30th at 8 months, the mother having bilious haemoglobinuric fever and schizonts presumably of subtertian malaria, showed schizonts on June 1st.

iii. Jean adds a valuable note on the literature of congenital malaria, and concludes that when it occurs it is due to placental haemorrhage. [Presumably he is not then responsible for the postscript to the first paper.]

C. L.

ARENA (G.). Contributo alla casistica della malaria congenita. [**Congenital Malaria.**]—*Pediatria.* 1928. June 15. Vol. 36. No. 12. pp. 642–652. [3 refs.] [Inst. of Clinical Pediat., Univ., Catania.]

The literature is considered and a case described. Although the mother is said never to have lived in a malarial place she contracted fever in the plain of Catania with a relapse having tertian rhythm. The child had fever 14 days after birth with tertian parasites in the blood, no plasmodia being found in that of the mother.

C. L.

HANSON (Henry). **Some Observations on the Incidence of Malaria among African Children.**—*Amer. Jl. Trop. Med.* 1928. May. Vol. 8. No. 3. pp. 249–254. [2 refs.] [International Health Division, Rockefeller Foundation, New York.]

In the discussion on this paper LYNCH remarked, " In the last few weeks I have seen two new-born babies, within three days of birth, with malaria parasites in the blood."

C. L.

GALLAIS (G.). Persistance du paludisme dans le département de la Meuse. [**Persistence of Malaria in the Department of the Meuse.**]—*Rev. Méd. et Hyg. Trop.* 1928. May–June. Vol. 20. No. 3. pp. 83–84.

In a homestead 13 km. from the source of the Aisne with marshy surroundings, certain inhabitants covering 4 generations have had febrile attacks yielding to quinine. The spleen was enlarged in two.

C. L.

THONNARD-NEUMANN (E.). Malaria und Asthma. [**Malaria and Asthma.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. July. Vol. 32. No. 7. pp. 358–362. [3 refs.]

Report is made on a series of 21 cases of asthma. They fall into two groups: the one group older, the asthma seasonal, malaria found in a third only of them and its treatment being without influence on the asthma; the second group younger, asthma non-seasonal, malaria invariable, and the asthma yielding to quinine. All three species of parasite were implicated in about the proportion of their local distribution.

C. L.

ZALLOCCO (Antonio). Asma e malaria. [**Malaria and Asthma.**]—*Pediatria.* 1928. May 15. Vol. 36. No. 10. pp. 523–530. [Inst. of Clinical Pediat., Univ., Rome.]

A child of 4 who had had measles and broncho-pneumonia, but not eczema or urticaria, experienced febrile attacks with rigors and sweating and an associated intense respiratory distress, with troublesome cough but without expectoration. The attack seen was typical of asthma and was cured by adrenalin. Tertian parasites were present, and 0·5 gm. of quinine was "injected" daily. Fever ceased at the fourth injection, and the asthma disappeared instantaneously and did not return. The differential diagnosis and the reports of like cases by others are considered.

C. L.

DE PENNING (H. C.). **Malaria and Appendicitis.** [Memoranda.]—*Brit. Med. Jl.* 1928. July 14. p. 53.

Being unaware of any report of the confounding of malaria with appendicitis [see, however, this *Bulletin*, Vol. 25, p. 131] the author describes three of the several which have come his way during the last sixteen years. The common features have been fever and vomiting with pain and tenderness in the right iliac region. All showed benign tertian parasites at a blood examination and all cleared up immediately after an "injection of quinine." The other side of the picture comprises two illustrative cases of appendicitis complicated by malaria and uninfluenced by quinine.

C. L.

LUNA GAÑÁN (José). Sindrome apendicular de origen palúdico. [**Appendicitis or Malaria.**]—*Siglo Méd.* 1928. Aug. 18. Year 75. Vol. 82. No. 3897. pp. 148–149. [3 refs.]

The literature is considered and the points by which a malarial mimicry can be distinguished from appendicitis are held to be: the overcoming by patience of the muscular defence, greater pain on light than on deep palpation, free passage of faeces and flatus, full pulse, flushed face and a fall in temperature following a fairly abundant sweat.

C. L.

SIVAMANI (V.). **A Case of Malaria simulating Confusional Insanity.**—*Indian Med. Gaz.* 1928. June. Vol. 63. No. 6. pp. 332–333.

The essential features were a low degree of pyrexia associated with a violent, noisy and irrational state, failure to discover plasmodia, and immediate response to quinine.

C. L.

DE AZEVEDO (A. Penna). Altérations pulmonaires dans le paludisme. [**Lung Changes in Malaria.**]—*C.R. Soc. Biol.* 1928. Sept. 18. Vol. 99. No. 26. pp. 888–890. [Oswaldo Cruz Inst., Rio de Janeiro, Brazil.]

The report describes the pulmonary condition found post mortem in 9 cases, varying from lobar pneumonia to congestion and oedema of the lower parts of the lungs. Unfortunately the individual reports do not mention plasmodia.

C. L.

SCHMIDTH (F. J. W.). Cas de paludisme aigu avec apoplexie cérébrale. [**Case of Acute Malaria with Cerebral Apoplexy.**]—*Ann. Soc. Belge de Méd. Trop.* 1928. Sept. Vol. 8. No. 2. pp. 165–167. [5 refs.]

A man, about 30, admitted unconscious with many rings of *P. falciparum* in thick drop, recovered consciousness after two injections of quiniform, but his speech was not understandable even to those who knew his dialect. A right-sided paresis with Babinski's sign gradually disappeared under quinine medication, 1 gm. daily by mouth, and speech returned, though a month later there was left a slightly abnormal gait.

C. L.

RABBANI (S. M.). **An Interesting Case of Malaria.**—*Indian Med. Gaz.* 1928. Aug. Vol. 63. No. 8. pp. 450–451.

A case showing subtertian parasites was treated with intragluteal quinine without benefit to symptoms, although the parasites disappeared permanently from the circulating blood. An intravenous injection was followed by temporary clinical benefit, but there was clinical relapse, and recovery followed intravenous injection of 0·3 gm. of neosalvarsan.

C. L.

TATE (D. Laurence). **Ruptured Malarial Spleen : Splenectomy : Recovery.**—*Brit. Med. Jl.* 1928. June 16. pp. 1022–1023. With 1 text fig. [Montego Bay Hosp., Jamaica.]

A violent fall on the abdomen, two blood-stained stools, severe abdominal pain ; patient seen by Tate 30 hours after the accident with an acute abdomen. At operation the peritoneum full of blood; 5 ruptures in the spleen which was removed and weighed 16 oz. Saline injections throughout operation, rectal salines for the next 24 hours, uninterrupted convalescence leading up to gonorrhoea four weeks later.

C. L.

STRUTHERS (E. B.). **Nephritis with Oedema caused by Malignant Malaria. (The First Case of Malignant Malaria admitted to the Shantung Christian University Hospital.)**—*China Med. Jl.* 1928. Apr. Vol. 42. No. 4. pp. 299–300.

Only numerous crescents were found in the blood of this case. Under quinine improvement was rapid, general anasarca disappeared in 4 days, albumin and casts in 6. Crescents persisted in small numbers on his discharge in good condition 13 days later.

C. L.

BANERJEE (Kali Gati). **On Some Clinical Features of Malignant Tertian Malaria.**—*Indian Med. Gaz.* 1928. Apr. Vol. 63. No. 4. pp. 202–204.

Diagnosis is clinical, treatment energetic, comprising for example, 160 grains of quinine in solution within 54 hours and 44 grains within 8 hours for adults. SINTON's alkaline method is preferred. Twelve cases are described classified as convulsive, diarrhoeic and miscellaneous, the last including hyperpyrexial, urticarial and typhoid subtypes.

C. L.

SINTON (J. A.) & BIRD (W.). **Studies in Malaria, with Special Reference to Treatment. Part IX. Plasmoquine in the Treatment of Malaria.**—*Indian Jl. Med. Res.* 1928. July. Vol. 16. No. 1. pp. 159–177. [47 refs.]

Plasmochin was given to young male European soldiers suffering from tertian malaria in Kasauli where reinfection may be excluded, the men being in four series and treated as follows : Series I. Plasmochin days and " rest " (in italics) days thus, 5, *4*, 3, *4*, 3, *4*, 2, *5*, 2, *5*, 2 ; 39 days, 17 of treatment and 22 of rest. Daily dose by body weight was for 7 stone 0·05 gm., 0·01 gm. being added for every additional stone ; average weight 10 st. ; average total dosage 1·26 gm. Series II. A total quantity of 2·24 gm. representing a course of 28 days with a daily dosage of 0·08 gm. If toxic symptoms showed, treatment was delayed, so that the time taken to complete the course was the measure of evident toxicity. Series III. As in Series I, but using plasmochin compound (0·1 gm. plasmochin and 1·25 gm. quinine daily) ; total plasmochin 1·7 gm., quinine 21·25 gm. Series IV. A continuous course of 28 days as in II, daily doses as in III ; total plasmochin 2·8 gm., quinine 35 gm.

Series I. 29 patients, treatment discontinued for toxicity in 2, 8 relapsed. Series II. 22 patients, treatment discontinued in 2, 3 relapsed. Time of treatment averaged 36 days, varying between 28 and 53. Series III, 15 patients, treatment discontinued in 1, 2 relapsed. Series IV. 20 patients, in none was treatment discontinued for toxicity. None relapsed. Average duration of plasmodia in thick film with plasmochin 1·71 days, with plasmochin and quinine 0·73 days, and average duration of fever similarly 0·8 and 0·3 days. A 71 per cent. relapse rate occurred in 14 cases of subtertian malaria with plasmochin alone or compound. In 7 controls with quinine and alkali it was 14 per cent.

" The safety margin of the drug seems to be small . . . Up to the present the results of the treatment of less than 1,000 patients with this drug have been recorded, yet at least three deaths are known to have occurred as the result of the action of plasmoquine and several cases of severe toxic effects have also been reported. If such events have occurred under the strict and careful conditions in which the drug has been tested, it seems to us that the time has not yet arrived when it can be given broadcast for use in general practice, however useful it may be under hospital conditions or under very strict and *daily* medical supervision. In the present state of knowledge of the action of this drug it is essential, in our opinion, that every patient under this treatment should be seen, at least, once daily so that administration can be stopped as soon as the first signs of toxaemia are detected."

C. L.

UNITED FRUIT COMPANY, BOSTON, MASS. SIXTEENTH ANNUAL REPORT. MEDICAL DEPARTMENT. 1927. Section II. pp. 26–81; 84–86. [**Plasmochin in Malaria.**]

I. **Plasmochin in Malaria.** By O. T. BROSIUS. [pp. 26–52. (2 refs.).]

Brosius has used (1) plasmochin tablets 0·02 gm. each, (2) plasmochin compound (0·01 gm. and quinine sulphate 0·125 gm.), (3) tablets with half the strength of the latter [which, however, MUHLENS has condemned and has had withdrawn, this *Bulletin*, Vol. 25, p. 565], (4) tablets containing 0·01 gm. plasmochin and 0·125 gm. hydroquinine, which have also been withdrawn. The results are fully tabulated. In 60 cases of tertian malaria treated with "moderate doses of plasmochin," namely, 0·06 gm. daily, 10 suffered from cyanosis, haemoglobinuria, nausea, headache or relapse. Of 18 cases of tertian malaria given 0·08 gm., the dose had to be cut down in one for dizziness, one had blackwater and all showed subtertian parasites in from 5 days to 10 weeks. Of 25 tertian cases treated with plasmochin 0·06 gm., and quinine 1 gm. daily, 1 became positive again to plasmodia on the 16th day. Of 40 subtertian cases treated with plasmochin 0·06 gm. and quinine 0·75 gm. daily, two had gastric pains, one had epistaxis, pallor suggestive of cyanosis, vomiting and gastric distress. It is noted of one that he had no ill-effects from a long plasmochin treatment, but not that it amounted at a maximum to 0·02 gm. daily and that he became positive to treatment during a pause in it. Of 28 subtertian cases receiving 0·06 gm. plasmochin and 1 gm. [not 0·1 gm. as stated] quinine daily, one died on the fourth day with what is described in a post-mortem report as malaria with early lesions of typhoid fever. "The lesions in the spleen and liver are characteristic"; the gut is not mentioned. In another, plasmochin had to be stopped on account of gastric pain. Of 20 subtertian cases receiving 0·08 gm. plasmochin and 1 gm. quinine, one died on the fifth day, the autopsy showing hepatic cirrhosis, but no microscopic report being given. Three relapsed. The conclusion, which not all will think that the evidence justifies, is—"A study of this series must be convincing that it is safe to administer plasmochin with quinine in moderate dosage in the dispensary clinic, and that this combination is an efficient therapeutic agent."

II. **Some Observations in the Limon and Panama Divisions of the United Fruit Company, with Special Reference to Certain Measures for the Control of Malaria December, 1927, to February, 1928.** By M. A. BARBER & W. H. W. KOMP. [pp. 54–62.]

Barber and Komp used thick films and found only 8 cases with gametocytes sufficiently numerous to afford likelihood of regular mosquito infection. "Cases may relapse soon after plasmochin-quinine treatment and may become dangerous carriers." Crescents may first appear in the blood or may increase during this treatment. One case re-examined 2 to 3 weeks after treatment, at whose close he had been seemingly parasite-free, showed crescents "far more numerous than in any case we encountered in our surveys." These cases were infective for mosquitoes. It is concluded that, in his paper abstracted above, Dr. Brosius has demonstrated the safety of unsupervised plasmochin and quinine and has "laid the foundation for the most effective use of this new drug."

III. **Observations on the Toxic Effect of Plasmochin.** By Wilhelm CORDES. [pp. 62–67. (4 refs.).]

Cordes has used 0·4 gm. of plasmochin and 1·8 gm. of quinine and notes "in occasional cases, without previous warning, very grave symptoms arise . . . It is only since we have used plasmochin that these accidents have repeatedly occurred with striking similarity." He has had two deaths, already reported [this *Bulletin*, Vol. 25, p. 566]. He cites two other cases taking these doses who showed dizziness, vomiting, jaundice with a drop of haemoglobin to 35 and concludes of plasmochin that "its administration requires a constant control of the patients which can be carried out effectively only in the hospital."

IV. **Plasmochin in Malaria.** By N. P. MACPHAIL. [pp. 67–69.]

Macphail, on the other hand, feels that his experience with 0·04 gm. of plasmochin and 1·33 gm. of quinine sulphate daily for 6 days is safe "under very ordinary supervision." The cases on this dosage must have numbered not more than 100.

V. **Clinical Results with Plasmochin.** By B. M. PHELPS. [pp. 70–76.]

Phelps found that eleven of nineteen cases treated wholly or in part with plasmochin or plasmochin compound showed some undesired reaction and that the use of more than 6 plasmochin compound tablets [0·06 gm. plasmochin] was apt to produce unpleasant symptoms quickly. In his belief it is a dangerous drug with unforeseeable individual results.

VI. **Comparison of the Combined Plasmochin and Quinine Treatment with the Plain Quinine Treatment.** By E. J. WHITAKER. [pp. 76–78.]

Whitaker had toxic effects on 6 of 40 cases treated with 0·06 gm. plasmochin and 30 grains of quinine. "The whole series . . . shows the advantage of the combined treatment."

VII. **Combined Quinine and Plasmochin Treatment for Malaria in Haitian Negroes.** By Walter MENK. [pp. 78–81.]

Menk relates a case taking 0·04 gm. of plasmochin with 20 to 30 grains of quinine and developing haemoglobinuria. Mostly he gave 0·02 to 0·03 gm. plasmochin with 30 or 40 grains of quinine and of this writes: "I do not think that the addition of plasmochin gives any better immediate *clinical* results," but believes that malaria-control is thereby facilitated.

VIII. **Editor's Comments on Plasmochin.** [pp. 84–86.]

Editorial comment holds that if a thick-film survey gives a 60 per cent. malarial infection "blanket-treatment" of the whole population is to be recommended. [Blanket-treatment is a delightful euphemism for herd treatment.]

C. L.

KRAUSS (William). **Treatment of Malaria with Plasmochin.**—*Southern Med. Jl.* 1928. Sept. Vol. 21. No. 9. pp. 729–732.

It is held that a daily dose of 0·06 gm. of plasmochin can be continued for 10 days without risk of toxic symptoms, though it seems that the

dose used was 0·1 gm. Degeneration of gametes under plasmochin is incorrectly believed to be a new observation. "I do not wish to be understood as holding that plasmochin has no place in the treatment of malarial fever. The tables show that in some cases it has proved quite efficacious." The tables are reproduced.

TABLE I.

	No fever after days of treatment.										
	1	2	3	4	5	6	7	8	9	Over.	Total.
Tertian :											
Quin. bisulp. gr. xxx	14	3	3	—	—	—	—	—	—	1	20
,, sulph. ,,	33	16	7	1	—	—	—	—	—		57
,, & alkali	16	4	1	—	—	—	—	—	—		21
Plasmochin 0·1 gm.	5	15	10	2	1	—	—	—	—		33
Sub-tertian.											
Quin. bisulp. gr. xxx	12	5	5	4	2	—	—	—	—	1	29
,, sulph. ,,	42	30	17	8	5	—	—	—	—		102
,, & alkali	17	7	2	1	—	—	—	—	—		25
Plasmochin 0·1 gm.	0	0	0	4	2	1	—	—	—		7
,, Comp. 5 tab.	2	8	3	4	2	1	2	1	2	1	26
,, +Quin. Sulph.	1	2	5	2	3	—	—	—	—		13

TABLE II.

	Plasmodia absent after days of treatment.										
Schizonts.	1	2	3	4	5	6	7	8	9	Over.	Total.
Tert. Plasmochin 5x.02	3	9	10	5	1	2	—	—	—		26
,, ,, & Quin. grs. xxx	2	2	3	1	—	—	—	—	—		7
E-A. Plasmochin 5x.02	0	0	2	1	1	2	—	—	—		7
,, ,, Comp. (·06+gr. xv)	0	0	0	5	6	7	5	1	—	1*	25
,, Plasm. 1. Quin. gr. xxx	2	5	2	0	1	1	—	—	—		13
				Total		...	...	...	...		78
Gametes.											
Tertian Plasm. ·1 daily	0	4	8	7	1	—	—	—	—		20
E. A. Quin.+ ·1 daily	1	1	2	2	0	0	0	1	—		7
E-A. Plasm. Comp.	2	0	1	2	2	1	2	0	1		11
				Total		...	...	...	...		38

* Relapsed, tertian, after 17 days.

TABLE III.

Quinin Intolerance Cases.

1 Tertian malaria vomited repeatedly after quinin, took plain plasmochin without discomfort.
2 Cases tertian, quinin intolerance, made a good recovery without symptoms on plasmochin plain.

TABLE IV.

Toxic Symptoms.

1 case tertian malaria, after 38 tablets plasmochin compound, epigastric burning.
1 case, tertian and E-A, after 33 tablets plasmochin plain and quinin, cyanosis.
1 case, tertian, after 28 tablets plain plasmochin, cyanosis.
1 case tertian, after 27 tablets plain plasmochin, cyanosis, vomiting, epigastric pain.
1 case, estivo-autumnal after 31 pills plasmochin compound, pyrosis.

C. L.

M'HUTCHISON (G. B.) & DUFF (W. R.). **The Treatment of Malaria by Plasmoquine Compound.**—*Malayan Med. Jl.* 1928. June. Vol. 3. No. 2. pp. 69–73.

"(1) Seventeen cases reacted favourably to treatment by plasmoquine compound alone.

"(2) The drug proved invaluable in a case of marked quinine idiosyncrasy.

"(3) The combination of plasmoquine compound three tablets with thirty grains of quinine daily had a remarkable effect in reducing within a short space of time the size of chronically enlarged spleens.

"(4) Five cases reacted abnormally: viz., two relapsed in spite of and during treatment and were ultimately cured by quinine, and three developed plasmoquine intolerance. Of the signs of intolerance noticed epigastric pain, colic and cyanosis are already well known; in one of our cases the cyanosis and pain were delayed for 12 hours after withdrawal of the drug and were most marked 36 to 40 hours after treatment had stopped. An action on the circulatory mechanism resulting in slowing of the heart rate is suggested as an additional sign of plasmoquine intolerance; upon this effect vertigo, deafness and tinnitus may be dependent."

C. L.

FISCHER (Otto). Ueber die Grenzen der Plasmochin-wirkung bei der Behandlung der natürlichen menschlichen Malaria. [**The Limits of Action of Plasmochin in the Treatment of Malaria.**]—*Muench. Med. Woch.* 1928. Aug. 10 & 17. Vol. 75. Nos. 32 & 33. pp. 1369–1372; 1417–1419. With 12 charts in text. [32 refs.] [Inst. for Ship & Trop. Diseases, Hamburg.]

Fischer concludes as a result of his work and that of others that the daily dose of plasmochin sufficing for the treatment of tertian malaria is 0·01 gm. per 10 kgm. of body weight or say 0·06 gm. in an ordinary person. In subtertian malaria a total of 0·15 gm. as injection or 0·2 gm. by mouth, whether given in the course of several days or within 24 to 36 hours, suffices to remove crescents from the peripheral blood in a period averaging 5 days; in fresh cases larger doses are necessary if their appearance is to be prevented. But in order to

destroy schizonts at the same time quinine, preferably 1 gm. (gr. xv) daily, should be given at the same time. Methaemoglobinaemia was absent or practically negligible. Failure of plasmochin was extraordinarily rare ; it was noted three times in subtertian cases.

C. L.

KARAMCHANDANI (P. V.). **Plasmochin as compared to Quinine in the Treatment of Malaria.**—*Indian Med. Gaz.* 1928. May. Vol. 63. No. 5. pp. 249–252. With 2 charts in text.

In one case of pneumonia complicated by tertian malaria quinine and sodium nucleinate gave a leucocyte count of 5,500 ; in another in which plasmochin took the place of quinine it was 11,000. One case of *P. vivax* infection was treated by plasmochin and one of *P. falciparum* with plasmochin compound ; the leucocytosis showed little difference. Three cases of malaria are reported as cured by plasmochin when quinine was believed to have failed.

C. L.

SCHIASSI (F.) & MERIGHI (G.). La plasmochina nella cura della malaria dei bambini. [**Plasmochin in the Cure of Malaria in Children.**]—*Policlinico.* Sez. Prat. 1928. May 14. Vol. 35. No. 19. pp. 893–898.

35 tertian and 6 subtertian cases were treated with plasmochin in 0·06 gm. doses for an adult daily for 7 days and thereafter for the last 4 days of 5 more weeks. The daily doses in grams for children were —up to 6 months 0·01 to 0·015, 6 months to 2 years 0·02, 2 to 6 years 0·03, 6 to 12 years 0·04. The advantages of plasmochin are its solubility and tastelessness. Cyanosis unaccompanied by other symptoms is a matter which cannot be disregarded.

C. L.

MAJUMDAR (Akhil Ranjan). **Some Observations on the Anti-Malarial Properties of Plasmochin.**—*Indian Med. Gaz.* 1928. July. Vol. 63. No. 7. pp. 394–396. With 4 charts in text.

Majumdar describes four cases treated with plasmochin compound. In one with vomiting the 6 tablets daily did not increase it, but it is interesting to note that the quinine, which after all is there though it is disguised under the term "compound," was taken in sufficient quantity to produce cinchonism.

C. L.

DE BUEN (Sadi). Nota preliminar sobre un ensayo de plasmoquina y quinetum en ambientes rurales. [**Plasmochin and Quinetum in Rural Work.**]—*Medicina Países Cálidos.* Madrid. 1928. May. Vol. 1. No. 3. pp. 242–249.

In cases treated in hospital crescents disappeared on the average in 3 days under plasmochin and in 7·6 under quinine. The dose of plasmochin has been as high as 0·12 gm. daily in a boy of 15, but in nearly all the 20 cases quinine was also given. In rural work, it is stressed, administration must not at present be left in the hands of subordinates. Quinetum, the mixed alkaloids of cinchona, proved as serviceable as quinine.

C. L.

OLIVIER (P. H.) & HULSHOFF (A. A.). **The Treatment of Malaria with Plasmochinum and Plasmochinum Compositum.**—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië.* 1928. Vol. 17. Pt. 1. pp. 80–91. With 2 folding charts. [16 refs.]

Apparently the daily doses given were those advised by the makers, namely, 0.06 gm. plasmochin, or 0·03 gm. plasmochin and 0·75 gm. quinine. Cyanosis and stomach trouble were rarely noted. In tertian and quartan malaria plasmodia disappeared in a few days, but relapses occurred in a number of cases. In subtertian malaria the effect on the rings was unsatisfactory; crescents on the average disappeared in 6 days and with plasmochin compound in 4 days; yet in both cases they might actually appear after 4 to 6 days. It is advised that the course of treatment should last 21 days. Plasmochin agreed well with a blackwater case. The drug must, at present at least, be "used only under strict medical supervision."

C. L.

WALRAVENS (P.) with the collaboration of VALCKE (G.) & BEQUAERT (M.). Observations concernant le traitement de la malaria par la plasmochine. [**Treatment of Malaria by Plasmochin.**]—*Ann. Soc. Belge de Méd. Trop.* 1928. June. Vol. 8. No. 1. pp. 73–79. [Bact. Lab. & Hosp., Elisabethville, Belgian Congo.]

Fourteen cases of subtertian malaria were treated with plasmochin compound tablets, 6 to 8 daily in 3 cures of 5 days each with 5-day intervals. In 5 of them there was evidence of intoxication, cyanosis, gastric troubles, headache, depression. In one plasmochin was effective where quinine disagreed. Disappearance of parasites was generally rapid, but no distinction seems to be drawn between schizonts and crescents. It is held that its action on parasites and fever is less rapid than that of large doses of quinine (2 to 2·5 gm.) and that it is not always well tolerated.

C. L.

ROSKOTT (E. R. A. Luyke) & SÉNO (R.). Ervaringen met plasmochin. [**Experience of Plasmochin.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1928. Vol. 68. No. 1. pp. 80–98. With 1 plate & 3 charts. [1 ref.] [Clinic, Associated Mining Companies of Billiton, Tandjong Pandan, Dutch East Indies.]

Plasmochin, it is concluded, has a strong influence on plasmodia, particularly on crescents, an influence morphologically emphasized by a good coloured plate. It also lessens the splenomegaly. It is felt that the question of relapse or reinfection has not been determined in these experiments. Complications due to the drug were infrequent in the 45 cases listed, but it is noted that there may occur entirely unforeseen and excessive blood destruction with production of methaemoglobinaemia. It is very important to determine the liver function so as to collect data regarding the working of plasmochin. The cyanosis is in the main enterogenous. The drug should remain in medical hands and the treatment be carried out in a clinic.

C. L.

DE LUCA (Benedetto). La plasmochinoterapia nella malaria. (**The Plasmochin Treatment in Malaria.**)—*Riv. di Malariologia.* 1928. July–Aug. Vol. 7. No. 4. pp. 484–502. With 18 charts on 4 plates. [67 refs.] [English summary p. 627.]

"In tertian and quartan cases plasmochin shows itself almost as efficacious as quinine. Fever attacks subside and cease in 2 or 3 days and the parasites usually disappear from the peripheral blood after 3 to 4 days.

"In subtertian cases the drug shows an effective action in destroying the sexual forms of the parasites, which rapidly disappear, but the small rings resist longer and fever only slowly decreases. Moreover, the drug acts only in the mild or not very severe cases.

"The plasmochin-quinine association is absolutely efficacious in subtertian attacks. The action of plasmochin upon the gametocytes is then combined with the action of quinine upon the schizonts.

"Quinine is absolutely superior to plasmochin in severe pernicious fevers.

"Relapses are not prevented even by the best plasmochin treatment. This, however, shows the best results in haemoglobinuric fevers, quinine idiosyncrasy and malaria in children.

"The plasmochin toxicity is minimum, the tolerance very good, but some symptoms (cyanosis and gastric disturbances) which follow the use of the drug, leave an unfavourable impression."

C. L.

PALMA (Modesto Dalla). Considerazioni sulla plasmochinoterapia della malaria. [**Plasmochin Therapy in Malaria.**]—*Riforma Med.* 1928. June 18. Vol. 44. No. 25. pp. 753–756. With 1 text fig. [31 refs.]

Plasmochin was given for 3 days in doses of 0·12 gm. and then for 20 days in doses of 0·08 gm. *P. vivax* actually disappeared in 60 hours, but on account of previous resistance to quinine the drug was continued as noted. On the 5th day the patient started a right basal croupous pneumonia, but in accordance with Schlesinger's experience the drug, as just noted, was continued. Crisis came on the 9th day of giving the medicament. Cyanosis, which had been present during the pneumonia, increased on the 14th day of administration, with bilious vomiting and asthenia, but no dyspnoea. Methaemoglobin was never found in blood or urine although the former was chocolate coloured. When cyanosis was at its height there appeared in the red corpuscles rounded bodies staining dark with the May-Grünwald-Giemsa stain and which are identified as Erhlich-Heinz bodies, or the capsule of the endoplasm of the corpuscle.

C. L.

PRADO (Alcides). O tratamento da malaria pela plasmochina. [**Treatment of Malaria by Plasmochin.**]—*Sciencia Med.* 1928. July. Vol. 6. No. 7. pp. 317–322. [4 refs.]

Two cases of tertian and one of subtertian malaria were treated with 6 to 8 tablets of plasmochin compound daily. The two former relapsed and in one of them treatment had to be stopped on account of abdominal pain. The last was cured. He had taken 132 tablets.

C. L.

RODRIGUEZ OLIVA (Rafael). Un caso de paludismo con grave intolerancia a la quinina tratrado con plasmoquina. [**Case of Malaria Intolerant to Quinine treated by Plasmoquin.**]—*Medicina Puises Cálidos.* Madrid. 1928. Sept. Vol. 1. No. 5. pp. 452–453.

In a case of subtertian malaria quinine produced urticaria, uncontrollable vomiting, and nervous and mental symptoms with loss of consciousness.

He was given 0·08 gm. of plasmochin daily for 8 days. The first dose produced urticaria which was, however, controlled by five drops of the official adrenalin solution. All plasmodia disappeared from a thick drop on the day after the treatment was begun and did not reappear The stoppage of administration was due to appearance of cyanosis.

C. L.

BRODEN (A.). La plasmochine dans le traitement de la malaria. [**Plasmochin in the Treatment of Malaria.**]—*Ann. Soc. Belge de Méd. Trop.* 1928. June. Vol. 8. No. 1. pp. 65–72. [6 refs.] [School of Trop. Med., Brussels.]

The six cases described fall in with general experience.

C. L.

MAZZA (Salvador). Acción de la plasmoquina sobre los gametocitos de infecciones espontáneas por hemoproteus. [**Effect of Plasmoquin on Haemoproteus.**]—*Prensa Méd. Argentina.* 1928. June 10. Vol. 15. No. 1. pp. 55–58.

The author tried plasmoquin on three species of birds infected with Haemoproteus. The first was a falcon weighing 93 gm., showing one parasite to every 10 fields. It was given ·005 gm. of plasmoquin. The following day the parasites were becoming vacuolated, but were as numerous as before and the dose was repeated. The next day one parasite only was found in 50 fields, and 0·01 gm. was given ; thereafter no more were found,

The second was a thrush infected with both Haemoproteus and Trypanosomes, but neither in large numbers. On three successive days it was given 0·005, 0·0025,and 0·0025 gm. ; a second thrush was given 0·005 gm. only. Both died soon after, but neither Haemoproteus nor Trypanosomes were found again before death, nor on examination of the heart-blood post-mortem.

The third was a Brachyspiza, one of the Fringillidae, which for six months had constantly shown Haemoproteus in its peripheral blood. Its weight was 18 gm. and it was given 0·001 gm. of plasmoquin. On the following day only a single parasite was found and thereafter none, the one dose having sufficed to render the blood sterile.

H. Harold Scott.

SHAHA (B.). **Report on Some Grave Cases of Malignant Tertian Malaria treated with Intravenous Injections of Quinine.**—*Calcutta Med. Jl.* 1928. Sept. Vol. 23. No. 3. pp. 117–123.

Having seen death from fall in blood pressure after intravenous quinine as ordinarily given, Shaha has adopted the use, in malarial emergencies, of smaller and repeated doses, 3 grains or less in divided doses intravenously. He has lost only 2 cases in 48, and urges the need of active intervention in these conditions unless one is to stand by and witness, as he strikingly says, " the passing of the life to the other end of eternity."

C. L.

DE LA TORRE (Theodore). **Intramuscular Injections of Quinine.**—*Sixteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1927. pp. 82–84. [Banes Hosp., Banes, Cuba.]

De la Torre has given 9,000 quinine injections into the glutei and the local records of cases of malaria have dropped to the lowest of any

district and blackwater fever has practically disappeared. The average case gets 1 gm. daily for 4 to 6 days (ampoules containing 1 to 1¼ cc. of solution of dihydrochloride in doses of 0·25 to 1 gm.) and then twice a week for at least three weeks, and thereafter "Pink Tonic Pills." After each injection he is, if possible, put on horseback and sent for a massage ride. Only four abscesses have been seen, two in children and two in women.

C. L.

MEGAW (J. W. D.), GHOSH (Sudhamoy) & CHATTERJEE (N. R.). **Stock Solutions of Quinine.**—*Indian Med. Gaz.* 1928. May. Vol. 63. No. 5. pp. 244–247. [Calcutta School of Trop. Med.]

Of 90 stock solutions of quinine examined mainly in tea estate hospitals, about a quarter were at least 25 per cent. below stated strength, and about 40 per cent. were deficient to the extent of at least 10 per cent. In one case a solution purporting to contain gr. 10 contained actually gr. 2½. Some of the accurate results were perhaps so because news of a coming inquisition leaked out. The amount of quinine which is stated on the prescription bears no necessary relationship to the amount which is actually swallowed. Details of a rough test are given by which a medical officer may check the amount of the drug in his dispensary solutions.

C. L.

YAMANAKA (S.). **On the Treatment of Malaria with the Total Alkaloids of Cinchona, "Panchina."**—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1928. May. No. 278. English summary p. 40. [In Japanese.] [Intern. Dept., Govt. Med. College, Formosa.]

This preparation of the total alkaloids of cinchona consists of sulphate of quinine 20, quinidine 10, cinchonine 35, cinchonidine 20, or 85 per cent. of crystallizable alkaloids. Treatment of 27 cases suggests that 1 gm. daily is unsatisfactory, 1·5 to 2 gm. efficacious and 3 gm. too poisonous.

C. L.

CARROLL (R. L.). **Effects of Quinine on Malaria Parasites.**—*Sixteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1927. pp. 81–82. [Almirante Hosp., Almirante, Panama.]

Of 100 cases 11 showed gametes on admission and 18 more during quinine treatment. Most of the cases were subtertian. The dose ordered was 45 grains daily for a week and thereafter 30 gr. Examination was daily by thick film.

C. L.

DRAPER (A. P.). **Early Treatment of Malaria.**—*Jl. Roy. Army Med. Corps.* 1928. Aug. Vol. 51. No. 2. pp. 135–137. With 2 charts.

A heavily infected company was treated with 20 grains of quinine sulphate in solution daily for ten days and thereafter the same dose on 2 days a week for 3 months, irrespective of diagnosis. Its improvement has been marked, as judged by admissions to hospital.

C. L.

BOULAY (A.), LHUERRE (H.) & MITARD (L.). Sur le passage de la quinine dans le lait maternel. [**Excretion of Quinine in the Mother's Milk.**]—*Bull. Soc. Path. Exot.* 1928. June 13. Vol. 21. No. 6. pp. 466–472. [10 refs.] [School of Med., Dakar, French West Africa.]

After citing published work of others the authors describe their own experiments. They administered to ten mothers the ordinary prophylactic dose used in French West Africa, namely, 0·5 gm. once daily of quinine hydrochloride in cachet. 10 to 15 cc. of milk were drawn off at intervals and added drop by drop to ten times its volume of 96 per cent. alcohol containing 2 per cent. of acetic acid, stood for half-an-hour, shaken and filtered. The amount of quinine in the filtrate is estimated by Tanret's reagent after it has been subjected to certain purifications. By this means it was found that excretion may begin in ¼ hour and is complete in 1 hour, the total quantity of quinine recovered varying from 1 to 5 mgm. As this is a fifteenth to a tenth of the dose given at Dakar to an infant it is insufficient to cure.

C. L.

CIUCA (M.) & ALEXA (I.). Traitement de la malaria par le stovarsol. [**Treatment of Malaria by Stovarsol.**]—*Arch. Roumaines Path. Expérim. et Microbiol.* Paris. 1928. Jan. Vol. 1. No. 1. pp. 105–114. [" Izolarea " Infectious Diseases Hosp., Jassy.]

The work is confirmatory of MARCHOUX's. All forms of *P. vivax* disappear from the blood after a minimum dose of 0·5 gm. of sodium stovarsol intravenously, but relapse occurs within ten days. A daily dose of 1·5 gm. has not been exceeded, but total dosage irrespective of age has varied between 0·25 and 16 gm. The spleen has never been completely reduced. Of 20 cases of this infection 9 have shown acute nephritis with albumin, blood and casts, disappearing on cessation of treatment but not interfering with the subsequent administration of quinine. In the one case of quartan and six of subtertian malaria the drug was completely inactive to schizonts and gametocytes. When given, the urine must be examined daily and the drug stopped on the least suggestion of renal irritation.

C. L.

SHAW, Jr. (Edwin H.). **The Absorption of Chemical Compounds by Red Blood Corpuscles and its Therapeutic Significance in the Treatment of Bird Malaria.**—*Amer. Jl. Hyg.* 1928. July. Vol. 8. No. 4. pp. 583–603. [9 refs.] [Dept. of Chem., Johns Hopkins Univ., Baltimore, Md.]

HEGNER (Robert), SHAW, Jr. (Edwin J.) & MANWELL (Reginald D.). **Methods and Results of Experiments on the Effects of Drugs on Bird Malaria.**—*Ibid.* pp. 564–582. [33 refs.]

The position taken starts from the basis that plasmodia are certainly intracellular (this *Bulletin*, Vol. 25, p. 574). Accordingly, a drug which affects them must penetrate red corpuscles. The writers' " studies on cinchona derivatives, quinoline derivatives and dyes have shown that only those compounds which do not have ionic groups are absorbed." The method of experimentation is that red cells are freed from white corpuscles by 5 washings with a gelatine containing physiological salt

solution, the gelatine protecting the corpuscles from mechanical injury. Solutions of the substances are then added to them and difference between the amount of the substance recovered from the fluid compared with that recovered from a control is taken as the measure of absorption. The relative solubilities in human corpuscles were quinine 4·6, quinidine 4·6, cinchonidine 3·5, quinatoxine 4·3, hydroquinatoxine 4·1, cinchotenine ethyl ester 2·6, quitenine 0·2, quinine methochloride 0·2, phenyl-p-arsonic acid-azo-hydrocupreine 0·1. The reports are full of detail.

C. L.

PLEHN (A.). Zur Frage der natürlichen und der medikamentösen Heilung der Malaria. [**Natural and Therapeutic Cure of Malaria.**] —*Ztschr. f. Hyg. u. Infektionskr.* 1928. July 3. Vol. 108. No. 4. pp. 685–699. [25 refs.]

Plehn describes a number of experiments on 5 cases of subtertian malaria which lead to the conclusion that the serum of one who has been spontaneously cured of and become immune to malaria has no lethal effect *in vitro* on the parasites of another man suffering from this infection. The same holds for serum obtained during the paroxysm. Complement disappears from the serum in strong malarial attacks, but the action of quinine is uninfluenced thereby. The mode of action of quinine is undetermined, but splenic enlargement is presumably defensive.

C. L.

MARTELLI (Bier Nello) & MASCAGNI (Giuseppe). La "Smalarina" nella Malaria. (**Smalarina and Malaria.**)—*Riv. di Malariologia.* 1928. May–June. Vol. 7. No. 3. pp. 277–300. With 1 chart. [English summary p. 406.]

Smalarina was useless.

C. L.

DE MELLO (Froilano) & VERNENCAR (H. P.). Contribuição ao estudo do valor terapêutico da Smalarina Cremonese. [**Therapeutic Value of Smalarina.**]—*Arquivos da Escola Méd.-Cirurg. de Nova Goa.* 1928. Ser. A. No. 3. pp. 339–385. French summary pp. 385–391. [Bact. Inst., Nova Goa.]

Minutely kept records show that smalarina is useless for prevention or cure.

C. L.

SCHÜFFNER (W.). Malaria tertiana. Die Entwicklung der Sporulationsform, Doppelinfektionen und Bemerkungen ueber die sogenannte Parthenogenesis der Makrogameten. [**Tertian Malaria. Development of Sporulating Forms, Double Infection, and Parthenogenesis.**]—*Cent. f. Bakt.* I. Abt. Orig. 1928. Aug. 21. Vol. 108. No. 5–6. pp. 297–304. With 7 text figs. & 1 coloured plate. [Trop. Hyg. Inst., Amsterdam.]

——. Berichtigung zur Arbeit "Malaria tertiana."—*Ibid.* Sept. 26. No. 7-8. p. 456.

Schüffner's paper is accompanied by a plate of coloured microphotographs showing multiple infections (*a*) with schizonts and schizonts,

(*b*) with schizonts and sexual forms both male and female. He finds that in schizogony there is displayed with strong Giemsa a violet-coloured body attributable to the periphery of the merozoite. He finds neither in the literature nor in his own preparations any justification for SCHAUDINN's conclusion that the macrogamete produces a schizont parthenogenetically, and he confirms the observation that although rarely, there are to be found in the same corpuscle a microgamete and a schizont, both schizonts presumably reaching the position in the same way [and, of course, as before hinted, the male remains free from the stigma of being a parthenogenetic parent.]

C. L.

PEREKROPOFF (G. J.). Zur Morphologie der Parasiten der chronischen Malaria. [**Morphology of Parasites of Chronic Malaria.**]—*Cent. f. Bakt.* I. Abt. Orig. 1928. July 25. Vol. 108. No. 1-4. pp. 26–41. With 75 figs. on 1 plate. [10 refs.]

Treatment produces involution forms of plasmodia, and if treatment clears the blood there will, generally speaking, be no relapse. If relapse occurs these forms have caused it. They are generally but not always intracorpuscular, and are to be looked for in thin smears. They may be dead and stain dark grey in the Giemsa and they merit further investigation, particularly with regard to the production of immunity.

C. L.

VAN STEENIS (P. B.). Bloedafbraak bij malaria chronica en andere splenomegalieën. [**Blood Destruction in Chronic Malaria.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1928. Vol. 68. No. 3. pp. 401–425. [27 refs.] [Military Med. Lab., Weltevreden.]

In acute malaria faecal urobilin was increased up to 20 times the normal quantity so long as there was fever or parasites in the blood. Urinary urobilin might be yet more strikingly increased, but rapidly declined when the temperature fell. In chronic malaria the quantity of faecal urobilin was greater than normal, even in the absence of fever and was yet further increased during relapse ; and the same holds for syphilitic and chronic septic splenomegalies, but not for other sorts. The urobilin output is the most exact measure of blood destruction, yet Steenis's work shows that the percentage of red cells coloured by vital staining according to the Chauffard-Widal technique is a fair measure of the urobilin output and much less tedious to effect, so that it may perhaps replace it.

C. L.

ARELLANO (Juan M.). Estudio de la bilirrubinemia en la malaria. [**Bilirubinaemia in Malaria.**]—*Crónica Méd.* Lima. 1928. May. Vol. 45. No. 779. pp. 144–147.

The writer summarizes knowledge of bilirubinaemia in malaria. Malaria affects the reticulo-endothelial system in blood, spleen and bone marrow and in malaria van den Burgh's indirect reaction is frequent but of variable intensity. The sequence of events is exaggerated destruction of red corpuscles, excessive formation of bile, bilirubinaemia ; and malarial jaundice is haemolytic.

C. L.

PORTO RICO REVIEW OF PUBLIC HEALTH AND TROPICAL MEDICINE. 1928. Mar. Vol. 3. No. 9. pp. 376–385. **Report of Bureau of Malaria Control 1926-27. Paper IV.**

Precipitin tests showed that when *A. albimanus* was given a choice of man compared with horse, ox, goat and pig it showed a marked preference for domestic animal blood even when it had to pass over man, or had also to surmount some difficulty as well to reach the animal. In *A. grabhamii* the preference for animal was even greater.

C. L.

TALIAFERRO (William H.) & TALIAFERRO (Lucy Graves). **A Precipitin Test in Malaria. Second Report.**—*Jl. Preventive Med.* 1928. Mar. Vol. 2. No. 2. pp. 147–167. With 3 figs. on 1 plate. [17 refs.] [Dept. Hyg. & Bact., Univ., Chicago.]; also in *Sixteenth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1927. pp. 232–247. With 3 figs. [17 refs.]

The authors' own conclusions are as follows :—

" A second series of 1,438 precipitin tests on the sera of 298 persons with 75 different malarial antigens indicates :—

" 1. The most satisfactory type of antigen used in our first work—the one prepared from placentas heavily infected with *P. falciparum* by mincing in a meat chopper, extracting with ether, digesting the ether-insoluble portion in Coca's solution—may become acid. In the acid condition it is not reactive, but after adjustment to a pH of 7·8 it is an efficient antigen. Thus, seven lots of this antigen with a pH of 7·8, in 154 tests on 64 serums, gave the following average results : 32 serums from infected persons gave 30 positive (4+++, 11++ and 15+), 1 doubtful and 1 negative ; 32 serums from persons negative in the thick film gave 1 positive (+), 4 doubtful and 27 negative.

" 2. Five lots of an antigen prepared from the blood squeezed out of a placenta infected with *P. falciparum* by concentrating the malarial parasites by centrifugation, drying *in vacuo* over sulphuric acid, digesting the dry powder in n/20 HCl for not over 20 hours, and adjusting the pH of the supernatant to about 7·8 with n/20 NaOH, gave the following results when tested with 78 serums : serums from 34 infected persons gave 29 positive tests (3+++, 14++ and 12+) and 5 negative tests ; serums from 44 persons not infected gave 9 positive tests (no +++, 2++ and 7+), 3 doubtful positives and 32 negatives. It seems probable that the dried concentrate can be preserved over long periods. Preliminary tests with an antigen prepared by extracting the same type of concentrate with Coca's solution and preserving under toluol also gave promising results.

" 3. No marked success was obtained from various antigens prepared from an infected spleen or from concentrated cultures."

Coca's solution is NaCl 0·7, $NaCHO_3$ 0·05, phenol 0·4, water to 100. An antigen, that is in this case the material used in *in vitro* tests, of great concentration was obtained by the methods of BASS and JOHNS (*Amer. Jl. Trop. Dis. & Prev. Med.* 1915, Vol. 3, p. 298) of centrifuging placental juice, in a case where the subtertian schizonts were full sized, for 30 minutes at 2,800 revolutions a minute. The large schizonts form a thick chocolate-coloured layer on the top of the red cells, and may be examined at once, or after washing in normal saline. The upper layers of red cells contain the small parasites. There seem to be unexplored possibilities in this direction as a preliminary to a thick film diagnostic examination. [For the authors' first report see this *Bulletin*, Vol. 25, p. 149.]

C. L.

SIMANIN (P.). **Experiments on Infection of** *Anopheles maculipennis* **Mg. with Malaria Plasmodium from a Quinine treated Malaria Patient.** —*Rev. Microbiol. et Epidémiol.* 1928. Vol. 7. No. 2. English summary pp. 225–226. [In Russian pp. 149–155. 8 refs.] [Malaria Station, Barnaul.]

It seems from the English abstract that the specimens of *A. maculipennis* were fed in Barnaul, Siberia, on 14 malaria patients who had taken quinine, and that some were examined there and others after being transported to Leningrad, a journey which did not affect development of plasmodia. Both *P. vivax* and *P. falciparum* were concerned. Regarding the former, 9 of 11 mosquitoes, fed after the patient had taken 1·8 gm. of quinine, became infected; regarding the latter, 50 of 87 showed oocysts or sporozoits, while in 2 cases the quinine taken amounted to 22·8 and 25·2 gm.

C. L.

SMIRNOWA (E. W.) & SIMANINE (P. I.). Sur la question de la corrélation entre le nombre des gamètes du sang de paludéens et le nombre des oocystes sur la paroi gastrique de l'anopheles. [**Numerical Correlation between Gametes in Malarial Blood and Oocysts in Mosquito's Stomach.**]—*Russian Jl. Trop. Med.* 1928. Vol. 6. No. 1. French summary pp. 69–70. [In Russian pp. 38–46. With 9 text figs. 4 refs.]

59 female *A. maculipennis* were fed on 11 patients whose blood contained from 9 to 125 crescents per 500 leucocytes. Specimens in every batch became infected, but the number of oocysts formed had no direct relationship to the number of female crescents presumably imbibed. It is believed that to get a 50 per cent. infection crescents should number at least 150 to 200 per cmm.

C. L.

POZZI (Arnaldo). Studii sul midollo osseo nei malarici. [**The Bone Marrow in Malaria.**]—*Policlinico.* Sez. Med. 1928. May 1. Vol. 35. No. 5. pp. 267–279. With 2 figs. on 1 coloured plate. [16 refs.]

Armed with a bistoury, a periosteal elevator, and a small trephine, Pozzi has investigated under local anaesthetic the cancellous bone marrow of a rib in 3 cases (II, III and IV) and of the head of the tibia in (I). The findings were :—

	I	II	III	IV
Normoblasts... ...	35	45	10	25
Granular cells ...	45	37	10	25
Undifferentiated cells	20	18	80	50

The normal count is given as—normoblasts 36·44, granulocytes including promyelocytes, myelocytes and polynucleated 41·25, and eosinophils 2·91.

C. L.

ZIA (S. H.) & FAUST (E. C.). **Results obtained from the Inoculation of Human Malarial Parasites into Experimental Animals, including those subjected to Provocative Treatment.**—*Riv. di Malariologia.* 1928. May–June. Vol. 7. No. 3. pp. 301–303. [4 refs.] [Peking Union Med. College, Peking, China.]

Zia and Faust attempted to produce infection by *P. vivax* or *P. falciparum* by inoculating blood from acute cases into hamsters, rabbits and guineapigs about two months old, some of them made " susceptible " by previous splenectomy or strychnine injection. All attempts failed.

C. L.

PEREKROPOW (G. J.). Zur Frage nach den lytischen Eigenschaften des Blutserums Malariakranker in ihrer Wirkung auf die Malariaparasiten. (Ueber die Schizontolysine Abrami und Carnots beim Paludismus.) [**Lytic Properties of the Blood Serum in Malaria and its Action on Parasites.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1928. Aug. 8. Vol. 57. No. 3-4. pp. 219–228. [31 refs.]

Perekropow's conclusions are that at the beginning of a paroxysm there are in the serum bodies lytic to plasmodia which have almost disappeared towards its end. They are destroyed at a temperature of 36° C., nothing can be said of their character, and perhaps they vary with species. Gametes seem specially resistant. Possible implications of the observation are considered.

C. L.

WARASI (W.). Ueber die Entstehung des Malariapigments. [**Origin of Malarial Pigment.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. Oct. Vol. 32. No. 10. pp. 513–517. [16 refs.] [Inst. for Trop. Diseases, Tiflis.]

The quartan parasite produces more pigment and dehaemoglobinizes the red corpuscle less than does the tertian parasite. If the precipitation of haemoglobin derivatives were the result of fermentative katabolism of haemoglobin, then, so runs the argument, different quantities should not be produced, so that, seemingly, the malaria parasite builds its pigments from assimilated material or from the permanent portions of its own body.

C. L.

WALKER (J.). La formule leucocytaire de la malaria. Note préliminaire. [**The Leucocyte Formula in Malaria.**]—*Bull. Méd. du Katanga.* 1927. Dec. Vol. 4. No. 4–5 & 6. pp. 138–139.

The large mononuclear increase in malaria is well known. An eosinophilia in convalescence is stressed, as shown in such a count as the following : Haemoglobin 75 ; polymorphs, 48 ; lymphocytes, 37 ; eosinophils, 9 ; large mononuclears, 6. In the absence of evidence of intestinal parasites eosinophilia should be considered as malarial.

C. L.

KAUDERS (Otto). Was hat die Malariatherapie der Parasitenkunde geleistet? [**What has Malaria Inoculation Therapy added to Knowledge of Parasitology?**]—*Wien. Med. Woch.* 1928. July 7. Vol. 78. No. 28. pp. 917–919. [23 refs.]

Kauders enquires whether study of injected malaria has added to our knowledge, and whether such knowledge as may have been acquired is applicable to mosquito-carried infection. In morphology he quotes HORN and others as finding gamete-like forms which may in all particulars resemble gametes, and explains this as an evidence of resistance to adverse conditions, correlating it with quinine resistance of gametes. [Yet surely if plasmochin had been discovered before quinine Kauder's suggestion would not have been made.] In biology he instances the gameteless Vienna strain handed on for years by direct injection and incapable of being carried by anopheles. [But see RUGE's note, p. 9 *supra*, so that we seem without evidence that direct transmission caused the sexless peculiarity.] In immunity he discusses the difficulty in producing second infections, which some have reported, and the possibility of conveying a passive immunity from such patients.

C. L.

HOTTA (Y.). Experimentelle Untersuchungen ueber die Malariaheilwirkung. [**Studies on Malaria Therapy.**]—*Cent. f. Bakt.* I. Abt. Orig. 1928. June 20. Vol. 107. No. 6-7. pp. 360–374. [State Serum Control Station & State Serotherap. Inst., Vienna.]

Reasoning and experiment lead Hotta to the conclusion that the therapeutic value of malaria lies in main part in the freeing into the circulation of katabolic products. These products, built by the parasites from the red corpuscles, have perhaps an elective working on those tissues of the brain altered by *Tr. pallidum.*

C. L.

KOPELOFF (Nicholas) & FIERTZ (Charles O.). **Parasites in Artificial (Inoculation) Malaria.**—*Proc. Soc. Experim. Biol. & Med.* 1928. Apr. Vol. 25. No. 7. pp. 562–563. [1 ref.] [Psychiatric Inst., Ward's Island, N.Y.]

A single strain of tertian malaria has passed through 300 patients during the last 5 years at this Institute. Three years ago hourly examinations were made on 4 patients for an unstated period, during which there was total absence of gametocytes. This is compared with GERSTMANN's experience [this *Bulletin*, Vol. 23, p. 496] and its importance stressed.

C. L.

WETHMAR (Rudolf). Ueber Anfangsfieber und Inkubation bei der Impfmalaria und der spontanen Malaria. [**Initial Fever and Incubation in Inoculation Malaria and Natural Malaria.**]—*Deut. Med. Woch.* 1928. May 18. Vol. 54. No. 20. pp. 826–828. With 3 figs. [13 refs.] [" Robert Koch " Inst., Berlin.]

Wethmar has reinvestigated the question of fever during the malaria incubation period. In 100 intravenously or subcutaneously produced

infections, the average incubation period was 5 days in the former and 12·7 days in the latter, while the preliminary fever occurred in 88 per cent. of the former and 40 per cent. of the latter, and lasted in the mean 3·3 and 2·3 days respectively. Regarding blood groups, preliminary fever was invariable. It lasted in the mean 3·7 of the 4·5 days of average incubation, when groups corresponded and injection was intravenous; in other cases incubation was longer and preliminary fever less consistent and of shorter duration.

C. L.

LAMBERT (Louis). L'accès paludéen ne parait pas être du à un choc hémoclasique. [**The Malarial Attack not due to Haemoclastic Shock.**] —*C.R. Soc.Biol.* 1928. July 27. Vol. 99. No. 25. pp. 615–616. [1 ref.]

Lambert found a paralytic, deliberately infected with malaria, who showed no fever in spite of numerous plasmodia. Injection of peptone and of milk did produce rise in temperature. Accordingly, so it is argued, malaria would have affected the same result, did the matter of protein shock enter into its causation.

C. L.

ST. JOHN (J. H.). **The Gametocytes of Tertian Malaria and their Early Appearance in Malaria transmitted by** *Anopheles punctipennis.*—*Amer. Jl. Trop. Med.* 1928. July. Vol. 8. No. 4. pp. 305–323. With 3 charts & 8 figs. on 1 plate. [5 refs.] [Army Med. School, Washington, D.C.]

In injected malaria, gametocytes may be present even on the first day of fever. *A. punctipennis* has been infected as early as the 4th day in mosquito-induced malaria. The average number of gametocytes to schizonts was 1 to 22 and of males to females 1 to 3·4.

C. L.

PIRES (Waldemiro) & PÓVOA (Hélion). A funcção reactivadora da malaria. (Nota previa). [**Reactivating Function of Malaria.**]—*Arch. Brasileiros de Med.* 1928. Aug. Vol. 18. No. 8. pp. 717–722; also in *Brasil-Medico.* 1928. Sept. 8. Vol. 42. No. 36. pp. 1003–1006.

The authors give information upon ten cases comprising tabes, cerebral syphilis, endarteritis, epilepsy and optic atrophy in which the spinal fluid, obtained either by lumbar puncture or by that of the cisterna magna, was negative to the Wassermann test. After therapeutic infection with malaria it became strongly positive in all instances without clinical benefit.

C. L.

WATSON (Malcolm). **Twenty-Five Years of Malaria Control.**—*Malayan Med. Jl.* 1928. Mar. Vol. 3. No. 1. pp. 7–10.

The witless may prefer *Hamlet* without Hamlet, yet remembering always that the name part is here cut out, there is joy to be got from the vivid descriptions contained in this paper of the acting of others in the play. "When first announced in 1898, Ronald Ross's discovery was treated by the world with undisguised incredulity, when confirmed it was said to be interesting but valueless . . . The honour of being the first in the Empire, and perhaps in the world, to use it successfully belongs to the Government of the Federated Malay States. Malaria

control by drainage was begun early in 1901 and before long the towns of Klang and Port Swettenham were completely freed from the disease. Then came the larger problem of rural malaria. In 1905 the F.M.S. Government gave $110,000 to drain the Kapar District . . . Again success came quickly." But in the Malayan Hills with their swiftly-running streams there was failure and no help from outside since malaria was absent from the hills of Italy where such advances were being accomplished. Ten years after Ross's discovery the situation was grave ; attempts at control had been abandoned in W. Africa in 1901 ; the idea had been unreservedly disowned with condemnation of mosquito control in India in 1909. In 1911 subsoil drainage, the putting of streams under ground, was started in Malaya and Singapore. In 1914, it was discovered in Malaya that mixed, unpoisoned, kerosine and crude oil completely destroyed larvae in running streams. In that year, too, STRICKLAND showed in Malaya that *Anopheles umbrosus*, the pest of shaded water on the plains, did not breed in the hills, nor did any other anopheles so long as shade was maintained, " a demonstration of the biological method of control, in every sense of the word 'without price.' " SCHÜFFNER and SWELLENGREBEL carried to the Dutch East Indies this " species sanitation " as they named it, the destroying only of species considered as dangerous and the neglecting of others. In 1916 the International Health Commission of the Rockefeller Foundation built a Research Laboratory under Malcolm Watson at Klang and from there species control spread to the United States and Panama. In Georgia, " after 9 years careful work, the Rockefeller Foundation is employing the methods which have commended themselves to workers in Malaya for many years " while " one reads in the reports of the Rockefeller Foundation of its 'pioneer work in malaria control beginning in 1916.' " The future is envisaged thus. " The whole object of the mosquito research of to-day should be the understanding and application of biological methods of control . . . I can look forward to the time when we shall be able to play with species of anopheles, say to some *Go* and to the other *Come* and abolish malaria with great ease, perhaps at hardly any expense."

C. L.

RODENWALDT (Ernst). **Guide for Government Officials, Estate Managers, etc. in treating Malaria-Problems.** — *Meded. Dienst d. Volksgezondheid in Nederl.-Indië.* 1928. Vol. 17. Pt. 1. pp. 63–79.

This note is delightfully clear and reasonable and explains how increasing knowledge justifies changing, and even contradictory, advice. It has points of principle of general value. No anopheles larva can stand movements of the tide, so that all spots where this is free do not breed them. Such are the virgin tide forests, since in them stagnant pools are not produced. Influences of tide and current produce local sand bars across river mouths, especially in bays. These bars are, at least for most of the year, complete and unbreached, and here *A. ludlowi* breeds. Settlements must never be made near such places. The local fishpond requires for commercial success much vegetation, so that larvae cannot be destroyed in them. There should be no such pond within 3 km. of human settlements. Running water breeding *A. maculatus* and *A. aconitus* must be avoided ; houses built 500 metres from such, with a pipe supply bringing the necessary water, should be

healthy. The Malay experience shows the risk of clearing ground unless sure of the local vector, and the point is emphasized by reference to the doubt as to whether the sun-seeking *A. maculatus* or the shade-loving *A. umbrosus* is concerned at Tandjong Pinang. The former being now condemned, no tree is to be cut down without urgent need. The prophylactic and therapeutic uses of quinine are explained.

C. L.

SCHARFF (J. W.). **Notes on Practical Measures of Malaria Prevention from the Point of View of Mosquito Control.**—*Malayan Med. Jl.* 1927. June. Vol. 2. No. 2. pp. 49–53.

This paper, read at the annual meeting of the Malaya Branch of the B.M.A., deals with matters of wide interest. In spite of publicity by lectures, free distribution of quinine at police stations did not appeal to the public, which is perhaps not unnatural. Instances of the actual costs of oiling and drainage are the following: Oiling a ravine, $324 yearly; installing subsoil drainage, $1,549, estimated upkeep $46·5 annually. Oiling a ravine and swamp $234 annually; installing subsoil drainage $674, value of 105 rubber trees felled or requiring felling $525, annual upkeep $21. In general the cost of drainage is 3 to 5 times the annual cost of oiling while security against breeding is much enhanced. The standard mixture for oiling consists of solar oil 50, kerosene 4, crude oil 10 and is considered the most efficient antilarval oil at present available. A new syphon drip can is described in which "the pressure is constant, being caused by the syphon, and does not alter with the varying height or head of water in the upper tank. In practice 4 gallons of oil last for 12 days, and once set the drip is perfectly regular." In nature, *A. ludlowi* "often lives in close association with fish which have a splendid laboratory capacity for these larvae."

C. L.

COOGLE (C. P.). **Preliminary Report of Screening Studies in Leflore County, Miss.**—*Public Health Rep.* 1927. Apr. 22. Vol. 42. No. 16. pp. 1101–1112. With 1 map & 1 fig. in text & 2 plates.

Coogle reports experiments in screening farm-tenant houses which have continued since 1924. He started handicapped with a belief prevalent among farmers that it had proved inefficient. He has found 8 times as many *A. quadrimaculatus* in unscreened as in screened houses, and a malaria rate in the latter 29 per cent. of that in the former. As the result of his experience he asks and answers a number of questions. He believes that practically all habitable tenant houses can be screened; that tenants want screens, an answer based on a shrewd offer by a planter; that tenants, particularly coloured ones, use their screens with reasonable care and can with patience be taught to distinguish effective from ineffective methods. No. 16 mesh galvanized wire is advised, the total cost of application has been reduced by experience to under $9 a house, and the gauze has lasted through the 3 years of the experiment and is likely to last at least one more. Whether screening comes into wide use will depend, it is felt, on whether increasing scarcity of labour will make sickness among tenants a crucial economic factor in causing shortness of labour at critical times.

C. L.

VALLI (Vittorio). Relazione della campagna antimalarica 1926–1927. (**Report on the Antimalarial Campaign, 1926-27.**)—*Riv. di Malariologia.* 1928. Mar.–Apr. Vol. 7. No. 2. pp. 104–140. With 7 figs. (2 maps). [English summary p. 214.] ["Istituto Autonomo per la lotta contro la malaria" Venetia.]

Valli is of opinion that Paris green is not economically practicable since it does not kill the first larval stages and since its action lasts only 5 to 6 days. Gambusia is held to destroy locally only 20 per cent. of larvae, vegetation interfering with its action. *Amiurus nebulosus* destroys all other fish, including gambusia, by means of its venomous fins. Two cases of fatal tetanus are reported after injections of methylurethanquinine, infection not apparently being conveyed through solution or syringe [which, if true, would imply that no precautions can prevent this tragedy after quinine injection]. A horse had died from tetanus a few days before, close to the dwelling of these women.

C. L.

PECORI (G.) & ESCALAR (G.). Relazione sulla campagna antimalarica dell' anno 1927. (**Report on the Antimalarial Campaign of the "Governatorato" of Rome in 1927.**)—*Riv. di Malariologia.* 1928. May–June. Vol. 7. No. 3. pp. 217–266. With 1 map & 3 text figs. [English summary pp. 404–405.] [Hygiene Office, "Governatorato" of Rome.]

The account is mainly of local interest. Quinine prophylaxis was applied in 1,668 cases and only 1·6 per cent. had fever attacks. Localities controlled by antilarval measures (Paris green and oil) showed fewer winter adult mosquitoes and a lowered malaria incidence. Zooprophylaxis seemed to be without effect.

C. L.

MISSIROLI (A.). La prevenzione della malaria nel campo pratico. II. Relazione. (**Prevention of Malaria in Practice. 2nd Report.**)—*Riv. di Malariologia.* 1928. July–Aug. Vol. 7. No. 4. pp. 413–455. With 12 graphs & 2 figs. [English summary p. 626.]

"The author summarizes the investigations carried out by the "Stazione Sperimentale per la lotta antimalarica" in the third year of its activity. He studies the questions of the relationship between artificial ponds and malaria, the practical limits of small sanitation improvements and, further, quininization with respect to eradication of malaria.

"Next he examines the measures of the incidence of this disease, particularly the spleen and parasite rates and the correlation between malaria morbidity and the surrounding temperature.

"He concludes, that a real success in human *bonification* is to be gained on the whole, one may say, only by preventing man from new infections."

C. L.

CLUZEL. Une visite à la station expérimentale antimalarique de Porto-Torrès (Sardaigne), (emploi du vert de Paris pour la destruction des larves d'anopheles). [**Employment of Paris Green at the Antimalarial Station of Porto-Torrès, Sardinia.**]—*Arch. Méd. et Pharm. Nav.* 1927. Apr.–May–June. Vol. 117. No. 2. pp. 141–153.

Cluzel, after a course at Paris under BRUMPT, studied the malaria situation at Porto-Torrès in the north-west of Sardinia. He has been

much impressed with the value of Paris green used in the usual 1 per cent. dilution every 8 days on the sluggish river Turitano which runs through the town. This has an infection rate of 60 per cent. of its 6,000 inhabitants. Anopheles have almost completely disappeared and only 7 new cases of malaria were registered during the summer months. Larvae still swarm beyond the 6 mile stretch where Paris green was employed.

C. L.

GARTON (W. M.). **The Control of Malaria and Mosquito Breeding at the Marine Barracks, Quantico, Va., during the Year 1927.**—*U.S. Nav. Med. Bull.* 1928. July. Vol. 26. No. 3. p. 747–754.

Some of this work has been described elsewhere. Of Quantico village the old inhabitants say that it is the "worst hole for malaria in the Potomac." Admissions to hospital for this disease have fallen from 28·26 per mille in 1922 to 0 in 1927. Apart from Paris green application, oiling has been employed with 1 part used crank-case oil to 5 parts kerosene, 1 per cent. of castor oil being added. Used crank-case oil has little tendency to form a good film.

C. L.

DE BOER (H. S.). **Malaria and its Control on Mombasa Island.**—*Kenya & East African Med. Jl.* 1928. Apr. Vol. 5. No. 1. pp. 2–11. With 1 folding map.

The anopheles found breeding in Mombasa were *A. costalis*, *A. mauritianus* and *A. cinereus*, the last two on very few occasions only. The breeding places were temporary, in pools during the rains, and permanent or semi-permanent, the numbers of these sources accounting sufficiently for those of adult insects. The aim was to prevent the hatching out of adults in the dry season so that there should be none to breed during the rains; it was attained partly by draining or filling and partly by oiling. Before the rains of 1927 four months had passed without an anopheles larva being collected on the island by gangs which had previously brought in many, while during the long rainy season only two anopheles were caught by a skilled collector. Unfortunately, the yearly deaths from 1924 labelled as malaria have been 74, 93, 84 and 101 respectively. "Malaria in most tropical countries is undoubtedly the rubbish heap of diagnoses."

C. L.

MARTINI (E.). Malaria und Malariabekämpfung in der Türkei. [**Anti-Malarial Measures in Turkey.**]—*Seuchenbekämpfung.* Vienna. 1928. Vol. 5. Nos. 1 & 2. pp. 6–11; 101–104. [Inst. for Ship & Trop. Diseases, Hamburg.]

Martini has been doing antimalarial work in Anatolia, in different parts of which the climate varies greatly in moisture and temperature. The mosquitoes are as follows. In open country: breeding in mountain streams *A. superpictus*; in flat country *A. elutus* where it is warm and *A. maculipennis* where cooler. In the shade *A. bifurcatus* and *A. algeriensis*. In rice-fields *A. sinensis* or *A. elutus*. Irrigation is practised for some gardens, so that some of the malaria is probably man-made.

All children get fever. The basis for a campaign carried out in 1926 is summarized under 31 heads. It has cost £T.72,680 for a population of 30,000 persons, but malaria, it is claimed, has been rendered negligible.

C. L.

UNITED STATES NAVAL MEDICAL BULLETIN. 1928. July. Vol. 26. No. 3. pp. 754–760. [1 ref.]—**Mosquito Control on the Isthmus of Panama.**

Certain paragraphs from the report of the health department of the Panama Canal for 1926 are reproduced. As already noted, this was the year with the lowest malaria record, the cumulative result of combined effort. The Malaya subsoil drainage system has been adopted in certain parts. Paris green is believed to have little local value. It is dearer than oil and requires dry conditions for the distributing of the diluting dust, and in order that the powder shall not stick to vegetation; such climatic conditions are largely absent locally. Malaria mosquitoes are rarely caught within town limits, but *Aëdes taeniorhynchus* and *Mansonia titillans* have enormous breeding grounds in Gatun Lake and in coastal swamps. The flight range of the former is put at 40 miles.

C. L.

FEDERATED MALAY STATES. **Annual Report of the Malaria Advisory Board for the Year 1927.** [HOFLIN (J. W.).]—10 pp. 1928. Kuala Lumpur.

This report records the steady antimalarial work which is being carried out in Malaya. A Chinese lecturer has been attempting to interest schoolchildren in the subject, and has encouraged and answered questions, thus :—

Q. Why should we call mosquitoes dangerous ? They do no violence to the laws of their peculiar instincts.

A. Because infected mosquitoes cause an attack of malaria which may result in death. From the law point of view manslaughter should be brought to justice.

C. L.

RUSSIAN SOCIALIST FEDERAL SOVIET REPUBLIC. People's Commissariat of Health. Travaux de la Conférence sur l'oeuvre antipaludique parmi les ouvriers des exploitations tourbières 11–13 Février 1928. [**Antimalarial Work amongst Peat-Bog Workers.**] In French pp. 123–128. [In Russian.]

The last conference on antimalarial work among peat-bog workers took place in 1926. The present one notes the improvement which has since occurred. In view of the degree of malaria still present it is advised that anti-malarial work must not only continue, but be extended in scope with co-ordination of the various organizations, medical and agricultural, concerned, with facilities for medical transport and extension of antimalarial measures to the isolated peat-bog worker.

It is proposed that a permanent staff should replace the temporary one, that the temporary workers should be engaged for at least six months, that the conditions of life for the staff, medical and lay, should

be improved, and that their work should include prevention as well as cure, should comprise research and the work of sanitary education, and should extend to the whole population. An entomological section should be added to antimalarial stations.

C. L.

KADANER (M.). Grossesse, malaria et quinine. Notes de pathologie tropicale. [**Pregnancy, Malaria and Quinine in the Tropics.**]—*Ann. Soc. Belge de Méd. Trop.* 1928. June. Vol. 8. No. 1. pp. 59–64.

Three cases of abortion are described in women who had neglected prophylactic quinine. Observations on 100 pregnancies among Europeans form the basis of the writer's conclusion that, in a country so malarious as the Congo, a prophylactic dose of quinine of 0·3 to 0·5 gm. daily is essential to prevent abortion. Pregnancy is not shortened thereby. He holds a malaria attack more likely to produce miscarriage than quinine. Taken post-partum in double the doses mentioned, the drug gives a straightforward puerperium. Only in 3 to 5 per cent. of women is menstruation rendered excessive by quinine [*cf.* HEWETSON, this *Bulletin*, Vol. 25, p. 570].

C. L.

HOLMES (M. J.). **Control of Malaria and Bilharziosis introduced into Australia by Returned Soldiers and Sailors.**—*Health.* Melbourne. 1928. May. Vol. 6. No. 3. pp. 70–75.

The report on malaria covers the years 1919–22. Great care has been taken to keep in touch with malaria-infected ex-soldiers and ex-sailors. No local epidemic focus of malaria has become established in Australia as the result of the return of many thousands of infected men.

C. L.

AMERICAN JOURNAL OF PUBLIC HEALTH. 1928. Aug. Vol. 18. No. 8. pp. 985–992.—**Advancement in Mosquito Control in the United States and Canada.** [JACKSON (L. E.), VAN HOVENBERG (H. W.), FILBY (E. L.), GREEN (F. W.) & CLARKE (J. L.).]

A questionary has elucidated the states and provinces where control is or is not being carried out or is judged unnecessary. A mosquitophobe opinion is being fostered.

C. L.

BEJARANO (Jorge), REY (Gabriel Vergara) & ABADIA (G.). La lutte antipaludéenne en Italie.—*Ann. d'Hyg. Pub. Indust. et Sociale.* 1928. May. Vol. 4. No. 5. pp. 263–276.

BOGOYAVLENSKY (N. A.) & YAMPOLSKAYA (F. S.). Quelques observations à propos du tableau parasitaire du sang des impaludés.—*Russian Jl. Trop. Med.* 1928. Vol. 6. No. 5. pp. 287–289. [5 refs.] [In Russian.]

DE BUEN (Sadi). La plasmoquina en el tratamiento del paludismo. (Estado actual).—*Med. Países Cálidos.* Madrid. 1928. Jan. Vol. 1. No. 1. pp. 26–38. [18 refs.]

CALDERÓN BLANCO (Sebastián). El tratamiento moderno del paludismo.—*Siglo Méd.* 1928. July 7. Year 75. Vol. 82. No. 3891. pp. 5–8. With 4 charts in text. [Med. Clinic, Faculty of Med., Madrid.]

CLARK (Oscar). A quinidina, o frio e a smalarina no tratamento do impaludismo.—*Folha Med.* 1928. July 15. Vol. 9. No. 20. pp. 234–236.

COMYN (Kenneth). Antimalaria Work at Moascar, Egypt, in 1925 and 1926, and the Results compared with the Previous Two Years.—*Jl. Roy. Army Med. Corps.* 1927. July. Vol. 49. No. 1. pp. 14–26. With 1 plan & 1 chart in text. [2 refs.]

FERMI (Claudio). I laghi artificiali e la malaria.—*Malariologia.* 1928. July 15. pp. 25–28. [Hyg. Inst., Univ., Sassari.]

GUIJA MORALES (Eduardo). Paludismo experimental.—*Med. Países Cálidos.* Madrid. 1928. July. Vol. 1. No. 4. pp. 300–338. With 24 charts. [17 refs.] French summary p. 338.

GUITARTE (A.). Gestación y paludismo.—*Semana Méd.* 1928. July 26. Vol. 35. No. 30. pp. 231–234. [12 refs.]

HARAZOFF (T. G.). Considérations sur la lutte antipaludique dans les pays du Transcaucase.—*Russian Jl. Trop. Med.* 1928. Vol. 6. No. 5. pp. 306–321. [In Russian.]

KOLMAKOW (A. S.). Zur Frage ueber die Stabilität des Malariaplasmodiums wie die Ursache der wiederholten Erkrankungen an Malaria.—*Russian Jl. Trop. Med.* 1928. Vol. 6. No. 2. German summary p. 141. [In Russian pp. 82–88.]

MATJUSCHENKO (B.). Ist Malaria ein Keimgift?—*Arch. f. Soziale Hyg. u. Demographie.* 1927. Sept. Vol. 2. No. 6. pp. 546–548. [18 refs.]

MAYNE (Bruce). A Note on Some Recent Attempts to transmit Malaria Organisms mechanically through Mosquito Biting.—*Indian Jl. Med. Res.* 1928. Apr. Vol. 15. No. 4. pp. 1067–1071. With 1 plate. [5 refs.]

——. The Influence of Relative Humidity on the Presence of Parasites in the Insect Carrier and the Initial Seasonal Appearance of Malaria in a Selected Area in India.—*Indian Jl. Med. Res.* 1928. Apr. Vol. 15. No. 4. pp. 1073–1084. With 1 chart in Text. [12 refs.]

MAZZA (Salvador) & TRELLES (Rogelio). Ensayos de tratamiento del paludismo por comprimidos de extracto de corteza de quebracho blanco.—*Prensa Méd. Argentina.* 1928. Sept. 10. Vol. 15. No. 10. pp. 441–443.

MORIN (Henry G. S.). Le paludisme dans la province Moi de Kontum en 1926.—*Arch. Insts. Pasteur d'Indochine.* 1928. Apr. No. 7. pp. 61–74. With 8 figs. on 4 plates. [See this *Bulletin*, Vol. 25, p. 553.]

PATERSON (A. R.). Notes on the Organization and Scope of Certain Anti-Malaria Work in the Federated Malay States with Special Reference to the Control of Malaria in the Capital Town of Kuala Lumpur by Means of Permanent Drainage.—*Kenya & East African Med. Jl.* 1928. July. Vol. 5. No. 4. pp. 112–131. [2 refs.]

RAGHAVA (S. N.). An Interesting Case of Malaria.—*Indian Med. Gaz.* 1928. June. Vol. 63. No. 6. p. 336.

ROSS (Ronald). Malaria-Control in Malaya and Assam. A Visit of Inspection, 1926–7.—*Malayan Med. Jl.* 1928. Mar. Vol. 3. No. 1. pp. 40–53. [See this *Bulletin*, Vol. 25, p. 119.]

TEGONI (G.) in collaboration with FRUGIUELE (T.) & WILLIAMS (L.). Indice Bibliografico della Malaria, 1926.—*Supplement to Riv. di Malariologia.* 1928. Vol. 7. Nos. 2 & 4. pp. 1–36; 37–80.

VALDÉS LAMBEA (José). Intervencion insolita del factor paludico en la historia de una tuberculosa sometida al tratamiento antigenico.—*Med. Países Cálidos.* Madrid. 1928. Sept. Vol. 1. No. 5. pp. 440–445. With 4 figs.

WILSON (P. W.). Notes on a Malaria Survey at Port de Paix, Haiti.—*U.S. Nav. Med. Bull.* 1928. Apr. Vol. 26. No. 2. pp. 320–323. With 4 figs. on 2 plates.

DENGUE AND PAPPATACI FEVERS.

KAMAL (H.). **The 1927 Epidemic of Dengue in Egypt.**—*Brit. Med. Jl.* 1928. June 30. pp. 1104–1106. With 9 charts. [2 refs.]

This is a careful clinical description of cases of dengue occurring in Egypt during an epidemic in that country in 1927. Examples of temperature charts are given and these demonstrate that the following types of pyrexia were noted :—

1. Abortive type, in which the fever lasted for one to three days.
2. Intermittent type, in which the fever usually lasted for seven days ; the intermissions were sometimes separated by an interval of from one to two days.
3. Saddle-back type, or remittent temperature.
4. Continuous type with febrile plateau.
5. Long type, in which the fever continued for ten to fifteen days.

The characters and distribution of the rash are carefully described and the differential diagnosis of the disease is fully discussed.

D. Harvey.

SCHMOURLO (S.). Au sujet de la dengue au Soudan. [**Dengue in the French Soudan.**]—*Bull. Soc. Path. Exot.* 1928. July 11. Vol. 21. No. 7. pp. 577–588. [15 refs.]

The author agrees with LEGENDRE that dengue is widespread, not only in French West Africa, but also in the French Soudan, where he was stationed on his first colonial tour. He encountered four typical cases within a week of his arrival at his station, the patients being his wife, his two sons and himself. He has also seen typical cases in other Europeans in the district and four cases in natives in his dispensary ; five other natives who had to be admitted to the same room went down with the disease in the course of a week. He explains that the dispensary is only a thatched building and was " humming " with mosquitoes. In his opinion " Fièvre Rouge " of LEFROU is only mild dengue [see this *Bulletin*, Vol. 25, p. 529].

D. H.

PERVÈS. Epidémie de " dengue " au centre de la marine de Dakar. [**Epidemic of Dengue at the Naval Station at Dakar.**]—*Arch. Méd. et Pharm. Nav.* 1928. Apr.–May–June. Vol. 118. No. 2. pp. 166–175. [5 refs.]

This epidemic, the third known to the author, commenced on August 30th, 1927, and ended in October. 105 men out of 525 were attacked, and there were mild cases who did not report sick. The local natives also suffered. Only a short stay in hospital was necessitated, average 4–5 days. Symptoms—nothing remarkable. In several cases the eruption appeared with the initial fever and also again with the relapse. Only 1 death occurred and this was in a chronic alcoholic with cirrhosis of liver and kidney and fatty heart. The differential diagnosis is discussed, especially as regards yellow fever and malaria.

Prophylaxis—destruction of mosquitoes and protection of the men

from bites. Mosquito nets are not of much avail as *A. aegypti* bites during the afternoon when the men are up and about. The author found no spirochaetes in any of his cases.

Treatment—aspirin and quinine. Arsenicals, such as acetylarsan, apparently had the effect of stopping the fever and preventing relapse and should be given a trial in all cases.

D. H.

COPANARIS (Ph.). Sur la récente épidémie de dengue en Grèce. [**Recent Epidemic of Dengue in Greece.**]—*Bull. Office Internat. d'Hyg. Publique.* 1928. June. Vol. 20. No. 6. pp. 899–901.

Dengue has been imported into Greece from Tripoli, Egypt and Syria. There was a severe epidemic in Crete in 1881, when half the inhabitants contracted the disease. In 1889 an epidemic occurred in Athens, followed, in 1895, by another outbreak, and again in 1910. Finally, dengue broke out in Athens in September, 1927, and continued till January of the present year. During this period about 20,000 persons were attacked.

There was nothing unusual in the clinical symptoms. Cases were occasionally noted in which there was congestion of the soft palate and enlargement of cervical glands. There was a constant leucopenia and a trace of albumin in the urine. Only a few cases were fatal and these were in aged or debilitated persons.

The search at the Greek Pasteur Institute for the spirochaete described by COUVY was without positive result. All cultures and animal inoculations were negative. "Stegomyia" was present in large numbers, but phlebotomus was rare. The disease died down and disappeared when this particular mosquito disappeared or became few in numbers. In one province—the most southerly—cases of sand-fly fever and dengue occurred at the same time.

D. H.

FERGUSON (E. W.). **Dengue Fever—the 1925-26 Outbreak in New South Wales.**—*Rep. of Director-General of Public Health New South Wales for Year 1926.* pp. 154–164. With 1 folding map.

A record of previous outbreaks in Australia is given and it is noted that there have been five great epidemic waves of dengue at approximately ten years interval; in New South Wales dengue was epidemic in 1898, 1906, 1916 and 1926. It is suggested that this period is determined by the changes in population and the disappearance of the immunity produced by previous outbreaks. The seasonal prevalence of the disease is accounted for by the changes in climate which determine the presence or absence of the insect vector.

In 1925–1926 the disease extended as far south as Newcastle, and it was observed that not only was the disease not confined to the coastal area, but that the inland towns of the more northern and, therefore, more tropical areas, were most heavily infected, isolated farms and stations escaping or being but slightly affected. Dr. Ferguson is of opinion that infection was derived directly from Queensland, since the disease started on the border and spread southwards into New South Wales. As in 1916 when CLELAND showed that *Aëdes aegypti* Lin. was the vector, so in this epidemic it was clearly shown

that the distribution of cases of dengue was closely related and, indeed, similar to the distribution of this mosquito. There is some evidence to show that it has extended its spread recently further inland both in Queensland and New South Wales. There was nothing new or remarkable in the symptomatology of the disease and in the experience of the author the rashes were ephemeral or appeared as a dull mottling under the skin.

The remainder of the communication consists of reports of departmental officers.

D. H.

CALVO CRIADO (V.). La actual epidemia de dengue en Andalucia. [**The Epidemic of Dengue in Andalusia.**]—*Medicina Países Cálidos.* Madrid. 1928. May. Vol. 1. No. 3. pp. 250–257.

CASTEJON (Rafael). La epidemia del "colorado" en Andalucia. [**The "Colorado" Epidemic in Andalusia.**]—*Ibid.* pp. 258–260.

These papers refer to the same outbreak. The first case was a mild one; the initial symptoms and early rash were typical, but the patient felt so much better at the end of three or four days that he would not remain in hospital. Owing to the character of the eruption the condition, believed to be new, was designated "colorado" [the "blush"].* The number of cases mounted rapidly and a fairly extensive epidemic resulted. The subsequent cases were "text-book" instances and there was no doubt of the disease being dengue.

H. Harold Scott.

MANOUSSAKIS (E.). Recherches étiologiques sur la dengue. [**Researches on the Etiology of Dengue.**]—*Bull. Soc. Path. Exot.* 1928. Mar. 14. Vol. 21. No. 3. pp. 200–205. [4 refs.] [Military Instructional Hosp. & Pasteur Inst., Athens.]

The author carried out some work on the experimental production of dengue in volunteers. He remarked that the disease produced experimentally was exactly similar in its clinical manifestations to the natural disease: sudden onset, aches and pains, especially in the lower limbs, supra-orbital headache, loss of appetite, and fever with a rubelliform rash, remission after two or three days followed by a recurrence of symptoms. An interesting point was that all the cases of experimental dengue were typical cases of that disease and left no sequelae. After a great number of passages there was apparently no increase or decrease of the virulence of the organism. The incubation period varied from 5 to 7 days and was symptomless.

The technique employed in the experiments was as follows:—

Twenty-five cc. of blood were taken from a case of dengue in the first twenty-four hours of the disease and placed in 200 cc. of normal saline, sealed up and placed in the incubator. Six cc. of the supernatant fluid, after six days incubation, was injected subcutaneously into a volunteer and gave rise to the disease. The strain was then carried from volunteer to volunteer by subcutaneous injection of 2 cc. of serum.

The author carefully examined the blood of the volunteers every 12 hours from the second day of incubation to the termination of the fever and failed completely to find any trace of the spirochaete described

* STICKER gives Colorado as the common name for dengue in the Spanish American colonies. (Mense's "Handbuch.")—ED.

by COUVY and by GOMEZ. No other organism of any kind or shape could be found. All attempts at culture also failed to demonstrate a spirochaete or other organism. On the other hand he was able to transmit the fever after filtration of the serum through Chamberland candle, L7 and L11, and the fever thus produced was identical with the natural disease and with that produced by injection of the unfiltered serum. Heating to 50° C. for half-an-hour destroyed the pathogenic property of the serum but heating to 40° C. did not destroy this power. The virus was not destroyed by exposure to sunlight for half-an-hour. If kept for seven days at 37° C. or 8 days at room temperature the pathogenic and antigenic powers of the virus were lost. That this was so was demonstrated by the fact that volunteers who had been inoculated with the old virus reacted when inoculated later with fresh virus.

Guineapigs inoculated with three times the dose given to the volunteers showed no reaction whatever.

It was found that the serum was not infective during the incubation period and did not become so until a few hours before the fever commenced; it continued to be infective throughout the fever. Throat washings and filtered urine were found to be non-infective.

It was not found possible to infect volunteers by the mouth, although in two cases repeated application of the serum of patients to the nasal mucous membrane of volunteers produced the disease.

A study was made of the immunity to the disease and it was found that persons who had recently, up to two months, had an attack were resistant to doses of infective serum. But the serum of these convalescents did not confer immunity on susceptible volunteers, whether the dose of serum was injected before, at the time, or after the infecting dose.

D. H.

BLANC (Georges), CAMINOPETROS (J.) & MANOUSSAKIS (E.). Quelques recherches expérimentales sur la dengue. [**Experimental Work on Dengue.**]—*Bull. Soc. Path. Exot.* 1928. July 11. Vol. 21. No. 7. pp. 525–537. With 6 text figs. [11 refs.] [Pasteur Inst., Athens.]

The recent severe epidemic of dengue in Greece has given the opportunity of carrying out a research on the transmission of dengue from man to man and to experimental animals. The work was done in the winter and spring when stegomyia were not present and cases of dengue were not occurring. The authors confirmed the previous work in that they were able to infect human volunteers by means of blood taken from cases in the first 24 hours of the disease. The result was the same, whether whole blood, serum, or diluted and filtered serum was used. But, in addition, they showed that if the serum be stored at room temperature in sterile flasks it remains infective for a period up to two months. Three cc. diluted and filtered and injected into the vein of a volunteer produced a typical attack of dengue after an incubation period of four days, although 54 days had elapsed since it was taken from the donor.

In one or two cases it was noted that if two or more volunteers were injected with infective blood, one of them might show no reaction, yet if the blood of this person was taken four days later it would prove infective for a susceptible volunteer—"Dengue inapparent," "cryptic dengue," "symptomless dengue." That this is not merely due to the

presence of the virus carried over from the first case was shown by the fact that blood taken from the symptomless case before or after the 4th to 6th day after inoculation was non-infective ; i.e., there must have been multiplication of the virus.

With regard to experimental animals the following were inoculated with doses of infective serum : monkey, dog, pigeon, fowl, white rat, rabbit, guineapig, and in none was any febrile or other reaction noted ; yet in two cases serum taken from guineapigs on or about the fourth day after inoculation produced typical attacks of dengue in human volunteers after an incubation period of 4 days ; but the infection could not be carried on to other guineapigs in series, i.e., the blood serum of a second guineapig did not produce an attack of dengue when inoculated into a human volunteer although the serum of the first had done so.

D. H.

SCHULE (Paul A.). **Dengue Fever : Transmission by** *Aëdes aegypti.*—*Amer. Jl. Trop. Med.* 1928. May. Vol. 8. No. 3. pp. 203–213. [6 refs.] [U.S. Army Med. Dept. Research Board & the Bureau of Science, Manila, P.I.]

The author gives a short historical account of the transmission of dengue by the mosquito *Aëdes aegypti* and notes that in previous work, already reported in this *Bulletin*, it was found that mosquitoes fed on cases of dengue did not become infective for susceptible people until an interval of eleven days had elapsed since the infecting feed.

The author, using the same room in the hospital at Manila in which some of the previous experiments had been carried out by SILER and others [see this *Bulletin*, Vol. 22, p. 943; Vol. 23, p. 360, 734], repeated these experiments and was able to show that the period between the infecting feed and the successful transmission of the disease may be as short as eight days. He explains the discrepancy on the ground of differences of temperature. During the period covered by his experiments the temperature of the air was considerably higher than it was in previous experiments and, as he points out, this phenomenon of increased rate of development of a protozoal parasite in the insect host at a certain optimum temperature has been already proved in the case of the development of trypanosomes.

Another interesting point brought out was that certain of his volunteers, who were all American soldiers, proved to be immune ; these immunes were all men who had either been residents for a considerable period in the country or, in the case of those who had not been for a long time in the country, were men who had been in parts where dengue was prevalent.

D. H.

SELLARDS (Andrew Watson) & SILER (Joseph F.). **The Occurrence of Rickettsia in Mosquitoes** (*Aëdes aegypti*) **infected with the Virus of Dengue Fever.**—*Amer. Jl. Trop. Med.* 1928. July. Vol. 8. No. 4. pp. 299–304. With 4 figs. [4 refs.] [Harvard Med. School, Boston, Mass. & Bureau of Sci. & Med. Dept. Research Board, U.S. Army, Manila, Philippine Is.]

The number of mosquitoes used in a transmission experiment was gradually reduced until only two were left : these two were allowed

to bite a volunteer and a typical attack of dengue resulted. They were then killed and examined for micro-organisms and this was controlled by observations on the laboratory stock of normal mosquitoes which had been proved to be non-infective. Sections of mosquitoes were cut serially and stained by Giemsa's stain, which gave the best results. The viscera of infected mosquitoes were also smeared on slides and stained and Rickettsia-like organisms were found with frequency by this method.

Unfortunately in the control mosquitoes a protozoon parasite (unidentified, but resembling *Lankesteria culicis*) appeared which at certain stages of its development might conceivably be confused with Rickettsia. Sections were made of 24 control mosquitoes and 16 mosquitoes from lots known to have caused infection. In about half of the dengue-infected mosquitoes masses of Rickettsia bodies were found quite unlike anything found in the control mosquitoes. They occurred in masses in the lining of the gut, and in smaller numbers were seen lying within the epithelial cells lining the gut ; none were found in the salivary glands or in any other tissues outside the alimentary tract. The two mosquitoes referred to at the beginning of the paper were sectioned ; one was negative, but the other showed typical Rickettsia.

In view of the infection of the control mosquitoes with the protozoon parasite, the authors are not prepared to lay too much stress on these findings ; but as a stock of mosquitoes has now been obtained free from this organism they propose repeating this investigation.

D. H.

KRAUS (R.). Ueber Denguë. [**Dengue.**]—*Wien. Klin. Woch.* 1928. Sept. 27. Vol. 41. No. 39. pp. 1371–1372.

The author in the Argentine had a large experience of dengue fever during the big epidemic in 1916 in that country. He is now at home in Austria, and in view of the prevailing epidemic of dengue in Greece and Southern Europe he gives a full clinical, pathological and etiological account of the disease, so that should cases occur, they may at once be recognized.

D. H.

i. KLIGLER (I. J.). **Studies on the Etiology of Phlebotomus and Dengue Fever. I. Introduction.**—*Ann. Trop. Med. & Parasit.* 1928. Aug. 28. Vol. 22. No. 2. pp. 143–150. [11 refs.] [Dept. Hyg., Hebrew Univ., Jerusalem.]

ii. ——— & ASHNER (M.). **II. Is a *Leptospira* the Causative Virus?**—*Ibid.* pp. 151–159. [12 refs.]

i. The author considers that Palestine is a country where sand-fly fever and dengue can be conveniently investigated. Sand-fly fever is endemic in Palestine whereas dengue is not, and the former disease is strictly limited in its occurrence to the months from May to October, when the fly is present, whereas a sharp outbreak of dengue which occurred in 1927 broke out on October 20th, after the sand-fly fever season was over, and continued for two months. Although there

is a similarity between these two diseases there are some points by which they can be clearly differentiated; sand-fly fever lasts for 3 days, dengue for 6 to 7 days, never less than 6, and the disease is, as a rule, more severe than sand-fly fever and a rash appears about the 4th day.

Both have been shown to be due to a filterable virus, Doerr 1909, Ashburn 1907; and the author has succeeded in repeating this observation for both diseases in Palestine. Also in both diseases it has been stated that a Leptospira has been isolated from the blood (COUVY–WHITTINGHAM), and with a view to confirming or refuting this the author carried out a very careful and elaborate research which is recorded in the second paper.

It may be said that already over a period of five years the author has examined the blood of some 40 cases of sand-fly fever, taken in the first 24 hours of the disease, by direct examination, by cultural methods and by animal experiments, and all with negative results as regards the detection of Leptospira.

ii. Before embarking on a further investigation of the blood of actual cases of sandfly fever and dengue the authors studied the physical, biochemical and biological properties of various species of Leptospira and also tried various methods of isolating these organisms by culture, and they adopted a method which in their hands gave the best results. Having satisfied themselves by means of this preliminary work that they were well equipped for the detection of the parasite in actual cases, they proceeded to examine 16 cases of phlebotomus fever and 9 of dengue. The blood was taken in the first 24 hours of the disease; cultures were made in Noguchi's medium in Locke's solution and on glucose-agar, semi-solid, +10 per cent. rabbit's blood. Direct examinations were made of the blood by dark ground illumination and by various staining methods. Finally, the supernatant fluid was subjected to fractional centrifugation and again examined, and guineapigs were inoculated from the sediment and from the blood. Both aerobic and anaerobic cultures were made and incubated at 30° C. The result of all this work was entirely negative so far as the discovery of Leptospira is concerned.

Some thousands of sand-flies, taken in places where cases had occurred, were sterilized, washed and triturated and examined by culture, by microscope and by animal inoculation, and all were negative for leptospira. It was also found that leptospira only survived for about 36 hours in artificially infected sand-flies or stegomyia. As a result of their work the authors are convinced that the virus neither of sand-fly fever nor of dengue is a leptospira.

D. H.

GRIDNEW (V. M.). A propos d'une épidémie de fièvre à papatasi à Tiflis. [**Epidemic of Pappataci Fever in Tiflis.**]—*Russian Jl. Trop. Med.* 1928. Vol. 6. No. 1. French summary p. 69. [In Russian pp. 3–9. With 1 chart in text. 9 refs.] [Trop. Inst., Tiflis.]

This paper records the occurrence of an epidemic of sand-fly fever among the soldiers of the garrison of Tiflis. As a result of this discovery cases were also found in the civil population. Sand-fly fever, in the opinion of the writer, is no new thing in Tiflis, but has previously been confused with influenza and other short fevers. Sand-flies appear in June and disappear in August and this is the season of the fever.

D. H.

i. NOWLAND (Reg. E.). **Unusual Case of Dengue Fever.**—*Med. Jl. Australia.* 1928. Aug. 4. 15th Year. Vol. 2. No. 5. p. 148.

ii. CILENTO (R. W.). **Dengue Fever.** [Correspondence.]—*Ibid.* Aug. 18. No. 7. p. 223.

iii. NOWLAND (Reg. E.). **Dengue Fever.** [Correspondence.]—*Ibid.* Aug. 25. No. 8. p. 254.

i. This case occurred in Sydney in the winter; no cases had been reported elsewhere in the district and mosquitoes were absent.

The patient lived 200 yards from the docks where ships coming from North Australia were berthed. She gave a history of having been bitten by a large strange mosquito a few days before the fever began. Symptoms: Fever, sore throat, severe pains in back and limbs, bright blood in vomit and stool. Macular rash on third day. Faint measles rash all over the body, rash on mucous membrane of mouth and palate; general bleeding from mucous membranes; great listlessness and prostration; no recurrence of fever. The pains in knees and back persisted for some weeks.

The suggestion is that an infected mosquito had been brought on board ship from the Northern Territories where dengue was at the time prevalent.

ii. Cilento suggests that the case recorded by Nowland might be one of endemic typhus. Cases of this disease have been reported from Queensland, right through Australia to Western Australia and on the Queensland–New South Wales border; such cases are usually associated with wharfs or grain stores where rodents are found, as was this case. He considers that unless the Weil-Felix reaction to exclude endemic typhus was employed it is not possible to call this case dengue.

iii. Nowland replies that endemic typhus was definitely excluded; the Weil-Felix reaction was negative. Influenza, typhoid and cerebrospinal meningitis were also excluded. He has had considerable experience with dengue and has seen many cases. He is satisfied that the case he described was one of dengue.

D. H.

LEFROU (G.). A propos de la dengue et de la fièvre rouge congolaise.—[**Dengue and Red Fever of the Congo.**]—*Bull. Soc. Path. Exot.* 1928. July 11. Vol. 21. No. 7. pp. 583–585. [3 refs.]

This is a reply to the criticism of LEGENDRE [this *Bulletin*, Vol. 25, p. 529.].

The author points out that dengue without its pains is not recognizable as such, and adds that he did not propose the name "Fièvre Rouge" as anything new, but simply to describe this condition, which may be mild dengue or a similar malady, or dengue modified by the African environment.

D. H.

CASTRONUOVO (G.). Epidemia d'Atene e Dengue (febbre rossa reumatoide tropicale benigna).—*Riforma Med.* 1928. Sept. 17. Vol. 44. No. 38. pp. 1218–1219.

SOARES (Pinto). Etiologia symptomatologia e prophylaxia da dengue—A epidemia do aviso francês "Antarés" no porto da Bahia.—*Sciencia Med.* 1928. June. Vol. 6. No. 6. pp. 259–265.

UNCLASSED FEVERS.

De (J. C.). **Difficulties in the Diagnosis of Fevers in the Tropics.**—*Indian Med. Gaz.* 1928. Apr. Vol. 63. No. 4. pp. 177–186. With 12 charts in text.

This interesting paper is a further plea for laboratory co-operation in the diagnosis of fevers in the tropics. Unfortunately, in the copy of the Gazette available, the paper has been badly treated by the binder. Each case is illustrated by a temperature chart with notes of the findings.

The first two cases are instances of blood infection due to *Bact. faecalis alcaligenes* which closely resembled typhoid fever in the clinical features. The bacillus was isolated from the blood in both cases and from the stools in one case. There is no mention of the result of agglutination tests with *Bact. typhosum* or *paratyphosum* or with the organism isolated from the blood.

The third case was an interesting one of septicaemia due to *Ps. pyocyanea* following on a wound the result of a street accident; the bacillus was recovered from the cerebro-spinal fluid. The fever in this case was continuous and lasted 22 days and was followed by complete recovery. The Widal test was negative. The next case of continued fever was one of kala azar, diagnosed by culture of the flagellates from the peripheral blood.

Another case of acute fever was proved, by the discovery after several attempts of tubercle bacilli in the sputum, to be due to tuberculous infection of the lung. The author notes "The manifestation of pulmonary tuberculosis as an acute febrile illness of the typhoid type is by no means uncommon."

The author then refers to mild abortive cases of typhoid fever and gives two charts showing examples of such cases diagnosed by isolation of *Bact. typhosum* from the blood. Two other interesting cases illustrated by charts were due in the one to pneumococcal septicaemia and in the other to streptococcal; both made good recoveries. Another case was proved to be due to *Bact. coli* infection, this bacillus being isolated in pure culture from the blood. Another case in which the fever ran an irregular course was eventually diagnosed liver abscess and was cured by emetine injection without operation, although a definite tender local swelling of the liver was detected. The last case of all was proved by blood examination to be due to filarial infection.

D. Harvey.

Heatly-Spencer (J.). **Some Clinical Observations on the Febrile Diseases of the Baluchistan Plateau.**—*Jl. Roy. Army Med. Corps.* 1928. June. Vol. 50. No. 6. pp. 427–437. With 6 charts in text. [2 refs.]

The author, who is the Medical Specialist, Western Command, India, gives an interesting account of the various fevers to be met with in that Command, and specially in the garrison of Quetta, Baluchistan.

Sand-fly fever is met with and naturally at the time of the maximum prevalence of the insect vector, but it has been noted that there are also atypical fevers resembling "sand-fly fever," which may occur at times

when it is difficult or impossible to discover *P. papatasii*. Some of these atypical fevers are undoubtedly malarial in origin ; on the other hand, there is a group of more importance which is intermediate between sand-fly fever and seven-day fever.

The onset in this type of fever is sudden with severe frontal headache and lumbar pain, and the fever lasts from four to eight days. The symptoms in the main resemble phlebotomus fever, but there are some important differences. There is no rash, no gastro-intestinal catarrh, no enlargement of the spleen or lymphatic glands. A mild pharyngitis and tracheitis is common, but rhinitis has never been observed. The pulse-rate is normal or slightly slowed. There are no joint or long bone pains. A series of 35 cases of this fever occurred in Quetta in the spring of 1925 when no mosquitoes had appeared and only isolated specimens of sand-flies could be found. The main clinical signs and symptoms were :—

1. Headache and lumbar pain.
2. Tracheitis.
3. Occurrence of microscopic blood in scanty viscid sputum.
4. Conjunctival injection.
5. Haemoptysis (macroscopic).
6. Pleurisy.
7. Pleural effusion.

Of these cases 28·5 per cent. showed the saddle-type of temperature chart. Blood cultures proved entirely negative both on ordinary and special media. No malarial parasites or spirilla could be found in blood smears and there was no bacteriological evidence of an enteric infection. The author suggests that an enquiry might be made into the etiology of this disease or diseases. So far as the local staff and equipment is available adequate attempts have already been made, but, as he rightly observes, it is obvious that the hospital and laboratory staff, who are fully occupied in the routine work, could not undertake any elaborate series of investigations ; it is for the higher authorities to decide if the provision of special staff and equipment to carry out such an investigation would be justified. Suggestions are made for the line of research along which such a special enquiry might proceed.

As regards the dysentery group, recent work in this station (Quetta) has confirmed MANIFOLD's results at Poona, and it is now agreed that over 70 per cent. of the dysenteries in Baluchistan are of bacillary origin. The vast majority of these cases are mild and are due to members of the Flexner group.

The author once again directs attention to the risks attendant on the indiscriminate use of emetine, not only in cases of dysentery which may or may not be amoebic in origin, but also in cases of undoubted amoebic hepatitis ; for such cases he says that he has discarded emetine alone and relies on a combination of this drug with one of the arsenical preparations, such as stovarsol, which are more rapid in their therapeutical effect.

An interesting point, illustrated graphically by means of charts, is that in cases of amoebic hepatitis treated by emetine alone the total leucocyte count remained high for a longer period than under stovarsol treatment.

It is now the practice of the writer to give a strictly modified course of emetine by injection—up to six grains—in combination with stovarsol in a dose of twelve grains per day for twelve days. A further course is given after a week or longer interval.

Two interesting cases of mixed infection are recorded, one being an amoebic hepatitis with paratyphoid B infection, the other hepatitis + malaria + paratyphoid A.

D. H.

BOINET, PIERI (Jean) & DUNAN. Recherches nouvelles sur la fièvre exanthématique du littoral méditerranéen. [**New Work on Exanthematic Fever of the Mediterranean Coast.**]—*Bull. Acad. Méd.* 1928. Oct. 9. Year 92. 3rd Ser. Vol. 100. No. 33. pp. 949–960. With 4 text figs.

The authors have seen many new cases of this disease and, in their opinion, it is neither true typhus nor attenuated typhus. It is a summer disease, the maximum incidence being in July and August, and is definitely non-contagious; cases can be treated in hospital wards without danger of spread. Old practitioners say it has been met with for thirty years in Marseilles and district. Records in 1910, 1917 and 1921 by various authors can be traced. Italian authors also record a similar disease; CARDUCCI in 1920 records cases from 1910 to 1920.

In this new series of cases the chief points noted were :—

(1) "Tache noire," first described in 1925. All the new cases showed this, a superficial necrotic lesion, which is in all probability the site of inoculation.

(2) Eruption, papular or nodular. The Weil-Felix reaction was negative in all these cases; several strains of Proteus were used. Inoculation of blood into guineapigs was negative. Lice were fed on patients and on volunteers without results. Ticks are numerous at this season, and it is suggested that these insects may be the vectors.

D. H.

BURNET (Et.) & OLMER (D.). Transmission de la fièvre exanthématique de Marseille aux singes inférieurs. [**Transmission of Exanthematic Fever to the Lower Monkeys.**]—*C.R. Acad. Sci.* 1928. Sept. 3. Vol. 187. No. 10. pp. 470–472. With 4 text figs.

In discussing this fever the authors point out that, so far, it has been found that the Weil-Felix reaction is negative and that no febrile reaction is produced in guineapigs by inoculation of the blood. They therefore tried intraperitoneal injection of blood from cases of fever into monkeys and the results are recorded in this short paper. The monkeys used were *Macacus cynomolgus* and three out of five gave a definitely positive febrile reaction; there were no symptoms apart from the fever. Also the blood of one of these febrile monkeys when inoculated into another monkey produced fever.

D. H.

MEGAW (J. W. D.) & RAO (S. Sundar). **Tick-Typhus and other Sporadic Fevers of the Typhus Group.**—*Indian Med. Gaz.* 1928. June. Vol. 63. No. 6. pp. 306–318. With 6 figs. on 2 plates, 18 charts & 2 maps in text. [14 refs.]

This communication is divided into two sections, in the first of which the various papers and reports concerning the occurrence of typhus-like fevers are discussed. All these papers have been noticed in this *Bulletin*.

The main typhus group of fevers is conveniently divided by the authors into three, and here a classification is used which apparently has already given rise to some criticism, that is, a classification of a disease in accordance with the insect vector, thus :—

1. Lice-borne typhus ... Epidemic typhus.
2. Tick-borne typhus .... (Rocky Mountain Fever).
3. Mite-borne typhus ... Tsutsugamushi disease (Japanese river fever).

The second part of the paper consists of some further observations on the typhus-like fevers of India which are not louse-borne and, as the senior author first suggested, may be carried by a tick.

Reports of cases of this type of fever have been submitted to Colonel Megaw from various centres in India and these are for the first time published in this communication. Clinically, these cases gave the picture which is already familiar and in several instances a clear history of tick bite just prior to the outbreak of the fever was obtained and the actual tick identified ; in all these cases, with one exception, infection by the louse was definitely excluded.

The Weil-Felix reaction was tested in practically all these cases, and in only two was a positive reaction obtained and this only in a dilution of 1-80. This is not in accordance with the findings of Fletcher in Malaya in his cases of tropical typhus, in which also the possibility of infection by a tick was considered and which Megaw would include among tick-borne typhus, nor does it agree with tick typhus of North America.

It is true, however, that the Weil-Felix reaction is not a specific reaction, but must be classed as a para-agglutination phenomenon, since the antigen employed has not an etiological significance. It may only be necessary to isolate a local strain of Proteus to obtain a positive reaction.

A very complete table is given which shows all the facts so far ascertained regarding these various forms of clinical typhus fever.

From this table it may be noted that tick typhus (Rocky Mountain fever) differs from so-called tick-typhus of India, in that Rickettsia bodies have never been noted in the ticks which are presumed to convey infection in the latter disease, whereas they are a marked feature in the tick which conveys the American type of the disease. Also the Rocky Mountain fever is readily transmitted to guineapigs and in these gives rise to a reaction comparable to that produced by the injection of blood of epidemic louse-borne typhus fever.

[It would seem, therefore, that the claim that this typhus fever of India is tick borne has not yet been established ; it is so far only a presumption : proof could only be obtained by experiments on volunteers, as was done in the case of yellow fever in America, and confirmatory proof would be the demonstration of Rickettsia in the ticks used in the experiments or in ticks which were supposed to have carried infection in sporadic cases.]

D. H.

Mooser (H.). Ein Beitrag zur Ätiologie des mexikanischen Fleckfiebers. [**A Contribution to the Etiology of Mexican Typhus.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. May. Vol. 32. No. 5. pp. 261–264. [American Hosp., Mexico.]

In spite of much work done, especially during the war, the problem of the etiology of typhus remains obscure. While Rocha Lima and

others are of opinion that *Rickettsia prowazeki* is the exciting cause, some investigators are unwilling to accept this hypothesis and others deny its truth. The difficulty is that the agent of Mexican typhus has not yet been satisfactorily cultivated on artificial media, and definite histological evidence of Rickettsia bodies in the tissues of man or animals, sick of the disease, is difficult to obtain; and also, a definite proof of the identity of the body as found in the infected louse with that in the endothelial cells of man or experimental animals has not yet been established. Smears of lice and stained sections of tissues cannot be contrasted or compared satisfactorily from a bacteriological point of view. The body is so small that it is most difficult to differentiate from cell contents.

In 1917 M. H. NEILL described a clinical symptom in guineapigs [see this *Bulletin*, Vol. 11, p. 141]. He observed that in 70 per cent. of his guineapigs infected with Mexican virus, there was a redness and swelling of the scrotum, which reminded him of similar results in Rocky Mountain spotted fever. Curiously, NEILL's observation was never confirmed, although in the author's experience it is a practical and never-failing symptom in guineapigs infected with Mexican fever virus.

The author's studies of this condition show that typical lesions were to be found not only in the vessels of the scrotum, as NEILL had already shown, but most of all in the endothelial lining of the whole of the tunica vaginalis there was a strong reaction consisting of swelling and proliferation of the endothelial cells, so that the whole processus vaginalis may be blocked up and the testes become fixed.

Attempts to demonstrate Rickettsia bodies in these tissues by means of Zenker's fixation method and Giemsa staining failed. Sections which had been fixed in Regaud's mixture were then stained by Giemsa, and the author was astonished to find in a few sections so treated numerous swollen endothelial cells which were packed with tiny reddish to reddish-blue diplobacilli, so much so that such cells could be easily picked out with the low power of the microscope. As these cells were found in sections of tissue it was difficult to determine the individual characters of these objects, but by making smears from the tunica vaginalis it was possible to see endothelial cells spread out and it was easy to demonstrate the intracellular micro-organism.

In smears from all the twenty-two animals which were killed during the period of scrotal swelling were found intracellular, gram-negative diplobacilli of the most slender proportions, which could only be clearly stained with Giemsa and which more or less filled the affected cells. The numbers of these were enormous, but the shape was difficult to recognize except at the periphery of the cells or in the neighbourhood of cells which had ruptured. In some cells they were only in single pairs or in small colonies. They were mostly the very tiniest reddish-pink or bluish-pink stained diplobacilli, with an unstained space separating the individuals, which were usually arranged in a straight line, or might make an obtuse angle with each other. Both ends of the individual bacilli were rounded off. Often pairs of diplobacilli were united by a bluish-stained cross-piece.

The author has not examined infected lice, but these forms have a remarkable resemblance to the bodies ROCHA LIMA found in the louse. Therefore the author considers that his findings give indisputable support to the Rickettsia theory of the origin of Mexican typhus.

He further injected guineapigs with a few drops of serous fluid from the swollen tunica and in three or four days they became infected.

The writer himself was accidentally infected by scratching the back of his hand with a pipette and in 11 days he got fever which lasted 12 days.

D. H.

PENFOLD (W. J.) & CORKILL (A. B.). **A Case of Typhus-like Fever.**—*Med. Jl. Australia.* 1928. Sept. 8. 15th Year. Vol. 2. No. 10. pp. 304–306. With 3 charts in text. [5 refs.] [Baker Med. Research Inst., Sydney.]

This was the case of a male, aged 38, who was admitted to hospital with a typhus-like fever, which lasted about ten days after admission. The Widal reaction was negative, and the Weil-Felix strongly positive. Injections of a *B. coli* vaccine were given intravenously on three occasions. There was a marked febrile reaction after each dose, and the temperature fell by crisis. In previous cases of mild typhus-like fevers in Australia, although the Weil-Felix reaction has been positive, injection of the patient's blood intraperitoneally into guineapigs has not given rise to any febrile reaction. Unfortunately in this case it was not possible to inoculate guineapigs with the blood during the fever.

D. H.

CHIABRERA (G.) & REITANI (U.). Contributo allo studio delle setticemie da *Micrococcus tetragenus.* [**Septicaemia due to** *Micrococcus tetragenus.*]—*Policlinico.* Sez. Prat. 1928. Sept. 17. Vol. 35. No. 37. pp. 1775–1780. With 1 chart in text. [29 refs.] [Principal Military Hosp., Alessandria.]

A description of a case of septicaemia due to *Staphylococcus tetragenus* is given. The difficulties of diagnosis in such a case are great and the possibilities of confusion with typhoid affections, undulant fever, influenza or malaria are referred to. In this case the diagnosis was settled by blood culture with positive results on three occasions. It is suggested that the portal of entry was the tonsil. Convalescence in these cases is apt to be slow and the weakness left by the illness may be great. The best mode of treatment is by means of an autogenous vaccine.

W. F. Harvey.

JAPANESE RIVER FEVER.

FLETCHER (William), LESSLAR (J. E.) & LEWTHWAITE (Raymond). **The Aetiology of the Tsutsugamushi Disease and Tropical Typhus in the Federated Malay States. A Preliminary Note.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1928. Aug. 22. Vol. 22. No. 2. pp. 161–174. With 7 figs. [9 refs.] [Inst. for Med. Research, Kuala Lumpur, F.M.S.]

This paper gives a clear description of the principal clinical features and etiology of tsutsugamushi disease, especially of the primary ulcer and bubo, as seen in four cases which occurred in Malaya and were

treated in the European Hospital at Kuala Lumpur. A detailed clinical description of these cases has already been given in the Bulletin of the Medical Research Institute of which the senior author was at the time Director. The disease is prevalent in Japan and Formosa, and also in Sumatra, which is only twelve hours distant across the straits from Malaya. The four Europeans contracted the disease while engaged in clearing, or rather re-clearing, an area of ground which had become overgrown with scrub and long grass and which was infested with rats. It was shown later that these rats harboured the mite *T. deliensis* which is the carrier of the disease in Sumatra, and it is highly probable that this mite is also responsible for the infection in Malaya.

A very careful and accurate description of the various Trombiculae found on rats and in man in the neighbourhood of Kuala Lumpur is given in the paper, and these descriptions should prove of great assistance to anyone who should happen to meet with cases of the disease.

It is proposed to deal with tropical typhus, which resembles tsutsugamushi disease in many particulars, in a further communication.

D. Harvey.

Ogata (Norio), Nagai (Shunji) & Unno (Sachitane). [**A Rare Case of Laboratory Infection by Tsutsugamushi Disease.**]—*Chiba Igakkwai Zasshi* (*Jl. Chiba Med. Soc.*). 1928. Jan. Vol. 6. No. 1. [Summarized in *Japan Med. World.* 1928. Apr. 15. Vol. 8. No. 4 p. 100.]

The authors record a case of tsutsugamushi disease contracted accidentally in the laboratory. One of their collaborators, Dr. Kitigawa, while inoculating an experimental animal unfortunately ran the needle of the hypodermic syringe charged with infective material into his own arm. The incubation period (16 days) was longer than in the natural infection and the clinical symptoms were by no means typical; but animal experiment and post-mortem examination proved that he had been infected with tsutsugamushi disease.

D. H.

van Driel (B. M.). Ein merkwürdiger Fall von Milbenfieber. (Pseudotyphus: Kedani). [**A Remarkable Case of "Mite Fever." (Kedani, Pseudotyphus, Japanese River Fever.)**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1928. July. Vol. 32. No. 7. pp. 363–368. With 1 chart in text. [2 refs.]

A case of this disease with unusual clinical features occurred in Sumatra. The patient was a Javanese contract field worker of 38 years, who had been 16 years in the country. He was admitted to hospital with fever and on examination a typical primary ulcer and swollen glands were at once discovered in the axilla. The patient himself volunteered the statement that he had been bitten on this site by a mite which he and his fellow-workers know as "koetoe babi," the native name for a mite or tick. Malaria and typhoid were excluded by careful examination of the blood and by Widal reaction, both of which were negative. The disease pursued its usual course for the first week or so, when the patient developed a peculiar tremor of the muscles, including the tongue, hands and feet. These tremors became general and so severe that they entirely prevented sleep. The patient became practically moribund, but gradually recovered as the tremors passed off and finally made a complete recovery. Another

remarkable feature was the presence of lesions of the eye, including inflammation of the optic disc and the presence of opacities in the cornea and vitreous. This also cleared up. The author emphasizes the necessity of an ophthalmoscopic examination in this and other tropical diseases.

D. H.

DUNLOP (George A.). **An Approach to Treatment and Illustrative Cases including a Case of Japanese River Fever treated with Stabilarsan (Boots) and Lumbar Puncture.**—*Malayan Med. Jl.* 1928. Sept. Vol. 3. No. 3. pp. 107–112. [11 refs.]

The treatment of various conditions is discussed; among them a severe case of River fever treated by deep subcutaneous injections of stabilarsan. A planter was admitted to hospital with fever and rash and a very severe headache, so severe that lumbar puncture was resorted to and 10 cc. of fluid under pressure was drawn off. The back of the left calf was the site of the primary ulcer and the glands draining this area were enlarged and painful. After one injection of stabilarsan, gm. 0·15, the headache cleared up and the temperature commenced to fall and returned to normal in 6 days, after a second injection of gm. 0·3. The primary ulcer cleared up remarkably quickly, much more quickly than in other cases not treated in the same fashion.

D. H.

OROYA FEVER AND VERRUGA PERUANA.

NOGUCHI (Hideyo). **Etiology of Oroya Fever. XII. Influence of Malarial Infection** (*Plasmodium inui?*) **Splenectomy, or both, upon Experimental Carrion's Disease in Monkeys.**—*Jl. Experim. Med.* 1928. May 1. Vol. 47. No. 5. pp. 821–827. [8 refs.] [Rockefeller Inst. for Med. Research, New York.]

Experiments were carried out by the author to ascertain whether malarial infection or splenectomy in monkeys in any way affected the experimental infection of these animals with the organism of Oroya fever. Blood was withdrawn from a monkey suffering from spontaneous malarial infection (*Plasmodium inui*) and injected into monkeys (*a*) one month before inoculation with virulent verruga material; (*b*) simultaneously with the verruga material; and (*c*) during convalescence from verruga infection of moderate severity. All the monkeys developed malarial infection and suffered one to three paroxysms during a period of about one month. The verruga lesions appeared in the inoculated animals in due course and showed no marked difference from the same lesions in control animals. The parasite, *Bartonella bacilliformis*, was recovered from the blood, which also contained plasmodia. The lesions in the convalescent animals continued to heal as usual.

The malarial infection therefore had no effect upon the course of verruga or upon the establishment of immunity. Similarly, splenectomy led to no appreciable aggravation of Bartonella infection. Even the combination of splenectomy with malarial infection did not appreciably aggravate the experimental verruga in monkeys.

D. Harvey.

MONJE (Carlos) & WEISS (Pedro). Sobre hematología de la verruga peruana. [**The Haematology of Verruga peruana.**]—*An. Fac. de Med.* Lima. 1927. June–July. Vol. 10. No. 2. pp. 97–101.

This is a description in general terms of the blood-changes met with in Verruga peruana. The intense anaemia is accompanied by the presence of corpuscles of the regenerative types ; hence the slide shows many immature corpuscular forms. Thus we find erythroblasts with basophilia, together with polychromatic and orthochromatic forms. Degenerate corpuscles are also found, but these are much less in evidence.

As regards the leucocytes, there is a shift of the Arneth index to the left, and promyelocytes, myelocytes and metamyelocytes are plentiful ; also lymphoblasts and young monocyte forms together with Turck's cells and the Rieder type of lymphocyte, evidence of profound shock to the haemopoietic system with marked efforts at regeneration.

H. Harold Scott.

DA CUNHA (Aristides Marques) & MUNIZ (Julio). Considerações a respeito da verruga peruana. [**Verruga peruana.**]—*Sciencia Med.* 1928. June. Vol. 6. No. 6. pp. 293–294.

Having noted that NOGUCHI had recorded as Bartonella bodies groups of bacillary elements met with in verruga nodules resulting from inoculation of a monkey with a culture, and, later, that the " organisms " were contained in the endothelial cells, the authors have again examined their smears and failed to see any of these groups, but only the single forms, as described earlier by them. They suggest that what NOGUCHI saw were secondary infecting organisms and not Bartonella at all.

H. Harold Scott.

UNDULANT FEVERS.

PUBLIC HEALTH REPORTS. 1928. Apr. 6. Vol. 43. No. 14. p. 819. —**Undulant Fever in New York State.**

It is estimated that 30 per cent. of the herds of cattle in New York State are affected with contagious abortion. From January 1st, 1926, to March, 1928, 24 cases of undulant fever have been notified to the authorities in New York State ; of these one was due to a laboratory infection with *Br. melitensis*, whereas the others were probably all caused by *Br. abortus*, since agglutination of that bacillus occurred with a higher dilution than with *Br. melitensis*. In one small outbreak the source of infection was traced to one herd of cows in which cases of contagious abortion had recently occurred ; the sera of the cows agglutinated *Br. abortus* in high dilution.

D. Harvey.

LINDTROP (Harry). Maltafieber an der Ostküste des Schwarzen Meeres des Kaukasus. [**Undulant Fever on the East Coast of the Black Sea.**]—*Russian Jl. Trop. Med.* 1928. Vol. 6. No. 3. German summary p. 207. [In Russian pp. 157–167. 35 refs.]

In the years 1924–1925, in the district of the Caucasus on the east coast of the Black Sea, six cases of undulant fever were diagnosed by means of agglutination tests, or by isolation of the causal organism from the blood. These were the first cases to be described in this area. In the course of the year 1927, thirteen more cases were discovered. The organism isolated was, culturally and morphologically, identical with the *Br. melitensis* of Bruce. On the epidemiological side it was suspected that the cases were due to infected goats, and on examination of a herd of 100 the sera of 16 gave a marked agglutination for *Br. melitensis*. In the opinion of the writer this disease is not a new importation to the district, but has previously been confused with malaria, typhoid, endocarditis, tuberculosis, etc.

D. H.

MISURACA (S.). [La febbre ondulante e le sue complicanze.] [**Undulant Fever and its Complications.**]—*Rivista Sanitaria Siciliana.* 1928. Apr. 1. [Summarized in *Ann. di Med. Nav. e Colon.* 1928. July–Aug. Year 34. Vol. 2. No. 1–2. pp. 113–115.]

Undulant fever which, up to a few years ago, was quite rare in Sicily has now assumed epidemic proportions and some hundreds of cases occur every year. The author has observed many cases and states that the majority are due to infection from goats by consumption of unboiled milk. He gives a full and detailed account of the symptoms and also of the complications which he has met with ; these include nephritis, tonsillitis, pharyngitis and oedema of the joints, which are rare, and neuralgic neuritis, which is common and tends to recur. Cutaneous manifestations were also noted, such as miliary eruptions, urticaria and purpura ; and chest symptoms, such as pneumonia, bronchitis and pleurisy. The mortality is low, 1 to 2 per cent., and death is usually due to intercurrent infection. As regards treatment, he speaks very highly of specific vaccine therapy which yielded excellent results in his hands.

D. H.

GIUGNI (Francesco) & SAVORINI (Giovanni). La ricomparsa di nuclei epidemici di febbre melitense. Rilievi clinici ed epidemiologici. Associazione di malaria e febbre melitense. [**Reappearance of an Epidemic of Undulant Fever. Clinical and Epidemiological Points. Association of Malaria with Undulant Fever.**]—*Giorn. di Clin. Med.* 1928. May 20 & June 10. Vol. 9. Nos. 7 & 8. pp. 345–350; 359–377. With 2 charts. [" Umberto I " Hosp., Lugo.]

No cases of undulant fever had been met with in Lugo for some two years when a fresh outbreak arose which was traced to a wandering flock of sheep introducing infection to cattle by excretal contamination of the fodder or bedding. Human individuals in turn became infected by drinking the milk or eating cheese made from the milk of the cows which had aborted. Seven cases are mentioned in detail; the diagnosis was made by agglutination of serum with *Brucella melitensis* alone or with *Br. abortus* also in equal titres. In one case, No. 7 in the list, malarial parasites were found in the blood in the early days of the fever, but the temperature returned after 4 days apyrexia, the effect of administration of quinine in large doses (2·5 gm. daily), and haemoculture yielded a growth of *Br. melitensis*. The serum from this patient also gave positive agglutination with this organism and with *Br. abortus*. The chart of this case is reproduced in the paper and shows well the temperature of the malarial infection in the early days, to give place to that more closely resembling undulant fever and later the intermittent " malarial " type of fever in the relapses.

The period of incubation varied between ten and twenty days. Most of the cases ran an average course. One, however, passed blood in the urine for nearly three weeks. This complication has been noted by others, but is not very common.

H. Harold Scott.

KAMPMEIER (R. H.). **Undulant Fever** (*Brucella melitensis*). **With Three Cases Each, Due to Bovine and Goat Origin.**—*Amer. Jl. Med. Sci.* 1928. Aug. Vol. 176. No. 2. pp. 177–181. [8 refs.] [Med. School, Univ., Michigan.]

Six cases of Brucella infection are recorded; three occurred in Michigan, where infection was due to consumption of unboiled cows' milk, and three in the state of Utah, which were due to the consumption of goats' milk. In the Michigan cases there was no contact with goats and the Utah cases no contact with cows.

Utah Cases. Goats' Milk.		Michigan Cases. Cows' Milk.	
Culture.	Agglutination.	Culture.	Agglutination.
++	1/100	—	1/1,280
++	1/320	—	1/320
+	not done	—	1/320

Clinically the Utah or *Br. melitensis* cases were much more severe than the Michigan or bovine cases. [The agglutinations were all carried out with *Br. melitensis*, no mention of agglutination with *Br. abortus*.] It is also interesting to note that all the blood cultures in the bovine cases were negative, whereas in the *melitensis* cases all were positive and the coccus was also recovered from the urine.

D. H.

MADSEN (Th.). **Undulant Fever** (*B. abortus*).—*League of Nations Monthly Epidemiol. Rep.* 1928. May 15. Vol. 7. No. 5. pp. 194–196. Map on p. 186. [1 ref.]

The author of this note refers to reports from various countries—United States, Germany, England, France and Italy—of the occurrence of cases of undulant fever due to *Br. abortus* or, at any rate, cases due to infection from cattle suffering from contagious abortion and in which infection from goats could be definitely excluded. A systematic investigation of this problem was carried out at the State Serum Institute of Denmark by Dr. Martin KRISTENSEN (see below), and the following is a *resumé* of his work :—

Since April, 1927, all sera sent to the Institute for Widal reaction have also been tested against *Br. abortus*. In one year 2,500 sera were received from 2,100 patients, and of these 222 gave a definite positive reaction (above 1-100) with *Br. abortus*. *Br. abortus* was also recovered in pure culture from the blood of 18 cases out of 27 attempts. Fifty sera from a district in Greenland, where there are no cattle, all gave a negative result. In 43 cases the infection could be traced to contact with sick cattle ; in 60 to contact + consumption of raw milk ; and in 68 cases there was no history of any contact with sick cattle but raw milk from such cows had been consumed. In no case was there any history of contact with goats or consumption of goats' milk. In no instance was there more than one case in the same family and cases of the disease were spread over the whole country.

The sex and age distribution is of interest :—

Years.	0–8	9–14	15–19	20–4	25–9	30–4	35–9	40–4	45–9
M. ...	Nil	8	20	24	23	28	23	8	6
F. ...	Nil	8	7	4	5	4	4	7	6

Years.	50–4	55–9	60–4	65–69	Unknown	Total
M. ...	1	7	3	0	15	166
F. ...	2	2	2	2	3	56

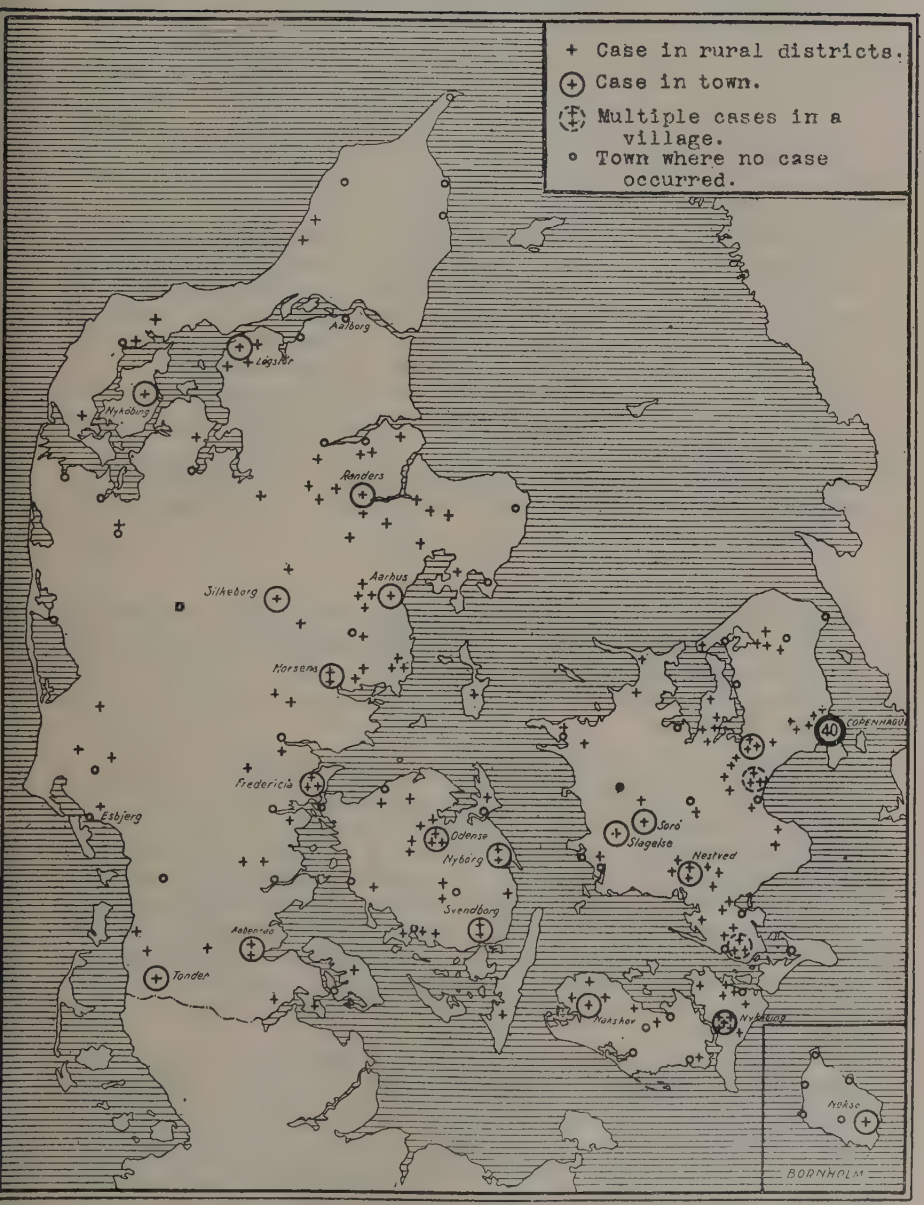
An illustrative case with a typical temperature chart is given showing an undulant type of fever lasting in all over four months, with pains in the joints and enlarged spleen.

D. H.

CARPENTER (C. M.) & BOAK (Ruth). *Brucella abortus* **in Milk and Dairy Products.**—*Amer. Jl. Public Health.* 1928. June. Vol. 18. No. 6. pp. 743–751. [20 refs.] [New York State Veter. College, Cornell Univ., Ithaca, N.Y.]

The authors point out that medical literature records a slow but steady increase in the number of cases of undulant fever in the United States.

They found only small numbers of *Br. abortus* in the milk of naturally infected cows. Plate counts of milk from carriers in several herds were made and showed an average of 20 to 440 colonies per cc. Their experience, that the majority of the organisms are to be found in the cream, coincides with that of HUDDLESON [this *Bulletin*, Vol. 24, p. 619].



Distribution of Undulant Fever cases due to *B. abortus* in Denmark from April 1st, 1927, to March 31st, 1928.

[Reproduced from *League of Nations Monthly Epidemiological Report.*]

A study of the milk of 378 cows from three dairies, as proved by inoculation of samples of milk into guineapigs, showed that 6·08 per cent. were infected. Approximately, 20 per cent. of these cows showed specific *abortus* agglutinins in their blood serum.

The longevity of *Br. abortus* in cream was tested. A quart of cream was divided into five samples of about 250 cc. and placed in sterile flasks; 5 cc. of a water-clear suspension of *Br. abortus* was added to each. The cream was stored in the refrigerator at 8° C. Guineapigs were injected four times at 2-day intervals with 2 cc. of each of the contaminated samples. After 8 days guineapigs were injected with the cream at 5-day intervals. The pH value of the cream when purchased was 6. The longevity of *Br. abortus* in butter was tested in like manner. The guineapigs were killed at approximately 5 weeks after injection and examined. Two of the strains infected guineapigs over a period of 10 days; the two other strains not after 8 days. The opinion is expressed that the germs were killed by the lactic acid produced in the cream. Samples of butter inoculated with certain strains infected guineapigs up to 142 days after inoculation.

Eighty-two samples of imported cheese were also tested, but infection by *Br. abortus* or *Br. melitensis* was never found in the guineapigs used in the experiments.

The authors are of opinion that exposure to pasteurization at a temperature of 140° F. to 145° F. for thirty minutes would destroy *Br. abortus*.

D. H.

KERN (Richard A.). **The Clinical Aspects of** *Brucella melitensis* **var.** *abortus* **Infection in Man. A Report of the First Cases recognized in Pennsylvania.**—*Amer. Jl. Med. Sci.* 1928. Sept. Vol. 176. No. 3. pp. 405–430. [57 refs.] [Med. Division of Hosp., Univ., Pennsylvania.]

This long and elaborated paper consists principally of a review of the present-day knowledge of *abortus* infections in man. The author is convinced that many cases of this disease are overlooked by the general practitioner in America, and with a view to the dissemination of knowledge and arousing interest, he gives a complete account of the clinical, bacteriological and epidemiological aspects of the subject with full references to recent work. At the end of the paper a detailed clinical description is given of two cases which occurred in Pennsylvania and were diagnosed by the author, on clinical symptoms and by the agglutination test. One of these was the first case of the disease notified in this State.

[For anyone who wishes to obtain in a single paper a review of present-day knowledge of *abortus* infection this paper well repays perusal.]

D. H.

SENSENICH (R. L.) & GIORDANO (Alfred S.). *Brucella abortus* **Infection in Man. Report of Seven Cases.**—*Jl. Amer. Med. Assoc.* 1928. June 2. Vol. 90. No. 22. pp. 1782–1786. [11 refs.]

This paper consists of a very careful and detailed clinical description of seven cases of undulant fever due to *Br. abortus* derived from cows'

milk. So far as the bacteriological diagnosis went, the sera agglutinated *Br. abortus* as shown below, and in one case a few colonies of this organism were obtained by culture from the blood. All the patients had just prior to the illness been consuming large quantities of raw cows' milk and cream from herds which were known to be infected.

Blood culture.		Agglutination.		
		Br. abortus.	*Br. melitensis.*	*Bact. typhosum.*
+	Case 1	1/3000	1/50	Nil
—	Case 2	1/3000	1/50	Nil
—	Case 3	1/1600	1/80	Nil
—	Case 4	1/320	1/20	Nil
—	Case 5	1/1200	—	Nil
—	Case 6	1/20	—	—
—	Case 7	1/320	—	—

The authors point out that successful culture of *Br. abortus* from the blood is exceedingly difficult, much more so than in *Br. melitensis* infections. This point has been noted by BURNET in experimental infection in goats [see this *Bulletin*]. Taken generally, the case could be classified in three groups, similar to the types found in *Br. melitensis* infection.—(1) Undulant; (2) Intermittent; (3) Ambulatory.

A summary of the characteristic symptoms is given: Anorexia, loss of weight and strength, headache and chills, fever and sweats of varying intensity through long periods of time, frequently with intermissions. The fever has a tendency to exhibit undulations, which may vary in character and length. Evidence of the effect of the disease on the nervous system is constant and arthritis is a common symptom.

Although a positive blood culture and positive agglutination test aid in arriving at a definite diagnosis, yet the authors are of opinion that true infections may occur in which neither can be obtained. (Case 6.)

It will be gathered from a perusal of the chief symptoms that there was nothing in the clinical course of the disease to distinguish these cases from cases of infection by *Br. melitensis*. That is to say, it is not possible on clinical grounds alone to say this is a case of *abortus* infection and this of *melitensis*.

D. H.

HABS (Horst). *Bact. abortus* Bang als Erreger septischer Erkrankungen beim Menschen. [*Brucella abortus* **as the Cause producing Septic Diseases in Man.**]—*Ztschr. f. Klin. Med.* 1928. June 30. Vol. 108. No. 4. pp. 445–462. With 7 text figs. [12 refs.] [Med. Clinic, Kiel.]

The author refers to recent cases of infection in man attributed to *Br. abortus* and especially to 5 cases in veterinary surgeons in Germany who had been treating cows affected with contagious abortion; these cases were believed to be due to direct infection from the placentas through cuts or abrasions on the fingers. In the 4 cases to be described

in this paper, he considers that infection took place through the milk. In Germany over 40 per cent. of infected cattle have the germ in the milk for considerable periods after they have suffered from abortion.

All four cases were in men who were employed in agricultural work, and at least two of them had nothing to do with cattle directly, but all were in the habit of drinking large quantities of cows' milk which had not been boiled. None had any contact with goats.

The only remarkable thing regarding the clinical course lay in its mildness; apart from the fever the symptoms were practically nil except for severe pains in the back. The temperature charts show a fever lasting about two months, but this had more of the remittent than the undulant character. Other diseases, such as typhoid and tubercle, were carefully excluded by the examination of the blood.

The cases were finally diagnosed on the results of agglutination tests; the sera of all four agglutinated *Br. abortus* strongly up to a dilution of 1-1000 and *melitensis* only in lower dilutions and not completely; also in one case a blood culture was positive. In addition, they were diagnosed as *abortus* infections on epidemiological grounds for the reason that "Malta" fever is unknown in Germany, except for a few imported cases and rare laboratory infections which have not infected other persons; also the goats in the district (Kiel) where these cases occurred have been carefully examined and found to be free from *melitensis* infection.

Italian writers are of opinion that infections of man from cattle are due to an original infection of the cattle with *melitensis*, but the author considers that this is unlikely in Kiel district as the goats are not infected.

[There is no account of a bacteriological investigation of the strain isolated from the blood.]

D. H.

VAN DER HOEDEN (J.). Over febris undulans bij den mensch, veroorzaakt door bacterium abortus infectiosi bovum Bang. [**Undulant Fever in Man caused by** *Br. abortus*.]—*Nederl. Tijdschr. v. Geneesk.* 1928. Oct. 6. 72nd Year. 2nd Half. No. 40. pp. 4907–4943. With 14 figs. [71 refs.]

The histories are quoted of 13 cases from various parts of Holland in which, by serological examination, the (not diagnosed clinically) diagnosis of "febris undulans" was made (in one case also confirmed by cultivation of *Br. abortus* Bang from the blood). The clinical picture and the temperature curve were as usual. One patient died from complications. The agglutination titre of the patients' serum against *Br. abortus* was at least 1 : 1600, whilst in 764 control cases it was never higher than 1 : 160. In 4 cases the infection could be related to the patient's occupation (obstetrical assistance to cattle suffering from infectious abortion); in 7 cases the probable cause was drinking of raw milk; in the other 2 cases both possibilities existed.

It is possible that so far "febris undulans" has been overlooked. On the other hand, the greater prevalence of infectious abortion of cattle as well as a greater virulence of the *Br. abortus* may account for the recent spread of the disease in man.

W. J. Bais.

LEGEZYNSKI (Stanislas). Deux cas d'infection humaine par le bacille de l'avortement épizootique de la vache (bacille de Bang). **Two Cases of Infection of Man by the Abortion Bacillus.**]—*C.R. Soc. Biol.* 1928. Sept. 18. Vol. 99. No. 26. pp. 919–920.

Two cases of *Br. abortus* infection are reported from Poland in which country undulant fever is unknown and infection from goats could be definitely excluded. The patients were veterinary officers who had treated cows suffering from contagious abortion; one of them developed a furuncle on the hand a week or so after exposure to infection. The incubation period of the fever was from 4 to 8 weeks. In the one case the fever was intermittent and lasted six weeks; in the other a wave of fever lasted 15 days, followed by an afebrile period of 20 days, and another wave of fever lasting 15 days. The blood serum of both cases agglutinated *Br. abortus* in 1-1,600 dilution and *Br. melitensis* at the same titre; the complement fixation test was positive. The Widal and Weil-Felix reactions were negative as were also blood cultures and urine cultures.

D. H.

ROCH (M.), MONEDJIKOVA (V.) & MARTIN (E.). Fièvre ondulante d'origine bovine chez l'homme. Infection par le *Bacillus abortus* de Bang. [**Undulant Fever of Bovine Origin in Man.**]—*Revue Méd. Suisse Romande.* 1928. Aug. 25. Year 48. No. 10. pp. 657–671. [16 refs.]

Three cases have come under the notice of the authors; one is described in detail.

This was the case of a farmer who kept no goats but had several cattle which had suffered from contagious abortion and which he himself had looked after: he and his family had also consumed the unboiled milk of the cows.

The fever lasted from February 29th to June 10th; the spleen was enlarged and there was a leucopenia; blood culture was negative (culture only kept a few days) as was the Widal reaction; a microscopical agglutination test against *Br. melitensis* was also returned as negative and an intradermal melitine test was also negative and thus the diagnosis was not arrived at till some time after the fever had ceased.

On the suggestion of Prof. NAEGELI the serum was retested against other strains of *Br. melitensis* and *Br. abortus* and was found to agglutinate *abortus* 1/500 *melitensis* 1/1000; an intradermal test with freshly filtered toxin was also strongly positive.

Thirty-three days later the agglutination test was repeated with the following result: *abortus* 1/1000, *melitensis* 1/250. Absorption tests were also carried out.

The patient's serum absorbed with *abortus* removed both agglutinins, but absorbed with *melitensis* the *abortus* agglutinins were only slightly reduced whereas the *melitensis* agglutinins were removed.

The rest of the paper is a resumé of cases of *abortus* infection reported in other countries and Switzerland may now be added to these.

D. H.

SCOZZAFAVE (I.) & WARNER (W. P.). *Brucella abortus* **Infection in Man.**—*Canadian Med. Assoc. Jl.* 1928. Aug. Vol. 19. No. 2. pp. 177–180. With 2 charts in text. [8 refs.]

The first two cases of *abortus* infections in man reported in Canada occurred in 1925 in Toronto, and three others were reported soon after in Ottawa.

Two further cases are now reported in detail by the authors.

Case 1. The patient had been ill for 8 months before he was seen with fever and rigors, his temperature chart was a typical undulant one and, as the authors note, comparable to the Pel Ebstein type of fever usually associated with that form of Hodgkin's disease.

Br. abortus was recovered from the blood and the blood serum agglutinated *abortus* 1/200, *melitensis* 1/80.

The source of infection was not traced.

Case 2. Gave a history of nearly six months' illness with a week of fever alternating with a week free from fever and with comparative good health, when she was able to get about and do house work, followed by another week of fever and so on; agglutination 1/320 *Br. abortus*, 1/166 *melitensis*.

Blood culture negative: source of infection not traced.

D. H.

CAMBESSÉDÈS (H.) & COCHEZ. Un cas de fièvre ondulante guérie par la vaccinothérapie. [**Case of Undulant Fever cured by Vaccine Therapy.**]—*Rev. Méd. et Hyg. Trop.* 1928. July–Aug. Vol. 20. No. 4. pp. 103–108. With 3 charts.

This case of undulant fever commenced in December, 1927, but was not definitely diagnosed until May, 1928. The diagnosis was arrived at by the agglutination test which was positive in 1/600 dilution; also a strongly positive intra-dermal reaction was given. On May 11th a small intravenous dose of a solution of *abortus* globuline was given; this was followed by a considerable febrile reaction, but next day the temperature fell to normal and the patient made a quick recovery. [The only criticism that one might offer is that the case had already lasted for six months before the dose of vaccine was given, and there are indications from the chart that the fever was nearing a spontaneous end. At the same time this "shock" method of treatment should be considered in long drawn-out cases.]

The author emphasizes the point that, in patients who are sensitized by a long course of fever, only a normal dose should be given; if the dose is too great, severe shock may result.

The state of sensitization may be judged to some extent by the result of the intra-dermal test.

D. H.

IZAR (Guido). Maltafieber und Chemotherapie. [**Chemotherapy of Undulant Fever.**]—*Seuchenbekämpfung.* 1928. Vol. 5. No. 3. pp. 147–154. [23 refs.]

The author advocates the use of trypaflavin in the treatment of undulant fever. 51 cases were admitted to hospital at one time. He found that the best effect was obtained if the drug was given in the maximum intravenous dose of 1 cgm. for each kg. of body weight or 0·6 gm. for a man of 60 kg. This dose may require to be repeated once or perhaps twice and care must be taken that the drug goes directly into the vein and not into the cellular tissue.

D. H.

DIMOW (D. K.) & NAKHAPETOFF (M. I.). Sur la question des affections pulmonaires spécifique dans la fièvre de Malta. [**Specific Lung Infections in Undulant Fever.**]—*Russian Jl. Trop. Med.* 1928. Vol. 6. No. 5. French summary p. 282. [In Russian pp. 281–282.] [Infectious Diseases Clinic, IInd Univ. & Trop. Inst., Moscow.]

The authors observed a severe case of undulant fever with recurrent attacks of broncho-penumonia; these attacks appeared and disappeared with the waves of temperature. They succeeded in isolating *Br. melitensis* from the sputum at the 2nd, 3rd and 4th recurrence of the attacks of broncho-pneumonia. The micrococcus isolated from the sputum was agglutinated by the blood serum of the patient to a higher degree than was the strain isolated by blood culture from the same patient.

D. H.

KRISTENSEN (Martin). Untersuchungen ueber die Rolle des Bangschen Abortbazillus als menschenpathogenen Mikroben. [**The Pathogenicity of the Abortus Bacillus for Man.**]—*Cent. f. Bakt.* I. Abt. Orig. 1928. July 25. Vol. 108. No. 1-4. pp. 89–102. With 6 text figs. [13 refs.] [State Serum Inst., Copenhagen.]

The author refers to the increasing number of cases of abortus fever in man in various countries discovered in recent years and considered to be due to infection by *Br. abortus* derived from cows.

In view of the prevalence of contagious abortion in Denmark and the large number of people employed in close contact with cattle, he considered that many cases would be discovered if careful bacteriological investigations were carried out. Hence the researches described in this paper.

A standardized emulsion of a strain of *Br. abortus* was obtained from the Veterinary College where it had been employed for the routine diagnosis of contagious abortion in cattle. All the sera sent to the Institute for the purpose of carrying out the Widal reaction were also tested against the *abortus* emulsion. 1,375 sera, obtained from 1,171 patients, were tested from April 1st, 1927 to November 15th, 1927, and of these 89 gave a positive reaction in at least a dilution of 1/100 with *Br. abortus*. The dilutions of sera actually employed were 1/100, 1/200, 1/400, 1/800 and 1/1,600, and the sera were classified as follows:

1/100	5
1/200	20
1/400	27
1/800	18
1/1,600	17
	87

Two of the sera were tested on a different scale and are not included.

The complement fixation test was also employed and was also strongly positive in all the sera which had given a positive agglutination. Of 277 sera which gave no agglutination, only two gave a feebly positive complement fixation.

The patients from whom these sera had been obtained were followed up, and it was found possible to make blood cultures from 20 of them,

and of these 13 yielded a culture of a micrococcus which gave all the classical reactions of the *Br. abortus* and grew well under an atmosphere of CO_2.

These cocci were also agglutinated by the serum of a rabbit which had been immunized by injection of the *abortus* culture used in the agglutination tests.

Four of the strains which had been isolated from the patients were taken along with five *abortus* cultures derived from cattle suffering from contagious abortion. These nine strains were used to produce high titre sera in rabbits, and cross agglutination and cross absorption tests were carried out, and proved these strains to be serologically identical as they were also identical in morphology and culture.

In addition, the strains isolated from the patients were inoculated into guineapigs and produced the typical signs and symptoms of *abortus* infection, and the bacteria were again isolated from these animals and identified. The serum of the guineapigs agglutinated the stock *abortus* culture.

Two cows which were pregnant were given intravenous doses of living *abortus* which had been isolated from two of the patients, and ten days later they aborted and the organism was isolated from the placental discharge and from the foetus.

A full clinical description of some of the cases is given and also a composite clinical picture of several of them, and it is shown that clinically, these were true cases of undulant fever and that there were no symptoms present which would not also be met with in *melitensis* infection, nor were any such symptoms unrepresented if all the cases were reviewed.

As regards the epidemiology, infection from goats or goats' milk could be definitely excluded in practically all the cases.

With reference to infection from cattle, the following table was drawn up :—

	♂	♀	
(*a*) Close connexion with cattle the subject of contagious abortion	33	1	34
(*b*) Accustomed to drink raw milk of such cattle	26	13	39
(*c*) Uncertain	9	7	16
	68	21	89

[Reports of cases of *abortus* infection in man have recently been received from various countries and in some of these cases the identification of the infecting organism has been based rather on circumstantial evidence than on definite bacteriological proof. But it can be said of the present series of cases that they have been definitely proved to be due to an infection with *Br. abortus* derived from cattle, the infecting organism having been isolated and identified by careful bacteriological tests. There is only one further point which might be of interest and that is a comparison by laboratory tests of the strains isolated in Denmark with known strains of *Br. melitensis* isolated from cases of fever in Malta of caprine origin.]

D. H.

BURNET (Et.). Inoculations comparées d'abortus et de melitensis chez la chèvre. [**Inoculation of Abortus and Melitensis in Goats. A Comparison.**]—*Arch. Inst. Pasteur de Tunis.* 1928. June. Vol. 17. No. 2. pp. 108–127. [5 refs.]

This paper gives an account of the inoculation of goats with *Br. melitensis* and with *Br. abortus.*

It is well known that *melitensis* produces abortion in goats; but is the disease in goats exactly comparable to the condition in cows infected with abortus? It is possible that *abortus*, which, in the opinion of the author is non-pathogenic for man when derived from cattle, becomes pathogenic for man by passage through the goat; and reciprocally, does *melitensis* lose its pathogenic power for man by passage through cows? In the following experiments an attempt was made to answer some of these questions.

Two series of experiments were carried out: Series I, on young goats which were not pregnant; the second series on older goats which were pregnant for the first time. All goats used in the experiments gave a negative blood culture and negative serum reaction before being employed. The test whether infection had taken place or not was the recovery or not of the organism from the organs post-mortem. Recently isolated strains of *abortus* and *melitensis* were used.

Two goats first of all received varying doses of killed *Br. abortus* and *Br. melitensis* followed by doses of living *abortus*, in one subcutaneously, in the other by the mouth. Blood culture was negative in both on four trials. They were killed and examined, but all organs were sterile except that a culture was obtained from the lining membrane of the uterus of one goat which had aborted.

Experiment II. Three goats received by diverse ways—instillation into conjunctival sac, ingestion, inoculation under the skin and into the veins—large doses of living *Br. abortus.* Blood cultures were made twelve times; all negative. On the contrary, in two goats, one of which had already received several doses of killed *melitensis* and which were inoculated with living *melitensis*, one yielded three positive blood cultures, the other two. The animals were killed and the organs examined; *melitensis* was easily recovered from the lymphatic glands; other organs sterile.

Four other goats, two of which had received doses of killed cultures of *melitensis*, were inoculated with living *melitensis.* Two blood cultures were taken from each; all positive.

The main differences, then, so far between goats infected with *abortus* and those infected with *melitensis* is that in the latter infection positive blood cultures are much more readily obtained.

Thus:—

26 blood cultures in 11 *melitensis* goats, 17 positive.
26 blood cultures in 6 *abortus* goats, only 1 positive.

Two pregnant goats were taken and one received an intravenous inoculation of *abortus*, the other a similar one of *melitensis.* The *abortus* goat aborted on the 35th day; the *melitensis* goat on the 20th. Both were killed and examined and cultures were obtained from spleen, kidney and uterus in both. The experiment was repeated with two other goats and both aborted on the 17th day. The germs were recovered from the foetus and from the goats when killed, and no difference could be made out.

It will be seen from the above experiments that abortion was produced in goats as readily by *melitensis* which had been derived from known cases of undulant fever as by *abortus* derived from cows the subjects of contagious abortion.

If the animals are killed soon after abortion, cultures can be obtained from all the organs, but if not killed till some months later the blood and the organs do not yield positive cultures. The germs remain for the longest time in the lymphatic glands in connexion with the mammary glands and the mucous membrane of the uterus, which is their habitat.

The author then discusses the question whether *Br. abortus* of the cow, which is but rarely pathogenic for man, becomes capable of producing undulant fever in man by passage through the goat. His conclusion is that if this is so, undulant fever without the goat would hardly exist.

D. H.

Ascoli (M.) & Sanfilippo (E.). Ueber Immunisierung der Ziege gegen Mittelmeerfieber. [**The Immunization of Goats against Undulant Fever.**]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1928. Aug. 8. Vol. 57. No. 3/4. pp. 229–233. [10 refs.] [Med. Clinic., Univ., Catania.]

The authors contend that the best way to control undulant fever is to immunize the chief subject of the disease, the goat. They consider that the method of detecting infected goats by agglutination tests and slaughtering such animals is too expensive and also difficult to carry out. Two pregnant goats, aged 1 year and 10 months, were taken and immunized with four very large doses of *Br. melitensis* (up to the washing of 18 agar plates) at intervals of ten days. In one instance the bacteria were killed by heat ; in the other gold chloride was used as an antiseptic. Both goats stood the process well and there was no fever and little local reaction. Ten days after the last dose of the vaccine an infecting dose of two 72-hours agar cultures of living *Br. melitensis* was given by the mouth. Agglutination positive. Blood culture and culture of bone marrow, sterile. Both goats remained well and both gave birth to healthy kids some weeks later.

The animals were killed one month after the birth of the kids and carefully examined ; all organs were healthy and the *Br. melitensis* could not be isolated from any. A control goat which had not been immunized was given the same infecting dose and became ill and lost weight ; it was killed and on post-mortem the lymphatic glands all over the body and especially those of the mammary region were markedly swollen and *Br. melitensis* was readily recovered from the glands and also from the bone marrow.

As a result of these experiments the authors consider that it is feasible to immunize pregnant goats by means of vaccine and in their opinion in this method lies the solution of the prevention of disease in man.

D. H.

Bastai (P.) & Rotta (C.). Sul significato clinico e biologico delle reazioni allergiche e delle agglutinazioni antimelitensi negli individui normali e nei malati di febbre ondulante. [**The Clinical and Biological Significance of the Allergic and Agglutination Reactions in Undulant Fever Patients and in Normal Individuals.**] —*Policlinico.* Sez. Med. 1928. Aug. 1. Vol. 35. No. 8. pp. 393–422. [27 refs.] [General Med. Clinic, Univ., Turin.]

The melitine and abortine used in the authors' experiments were prepared by them in the following manner: Twenty-two strains of *Br.*

melitensis were sown in one broth tube and seventeen strains of *Br. abortus* in another. After 36 hours flasks of broth are seeded with 1 cc. of the infective cultures and placed in the thermostat for 20 days, then heated to 56° C. for an hour and filtered through a candle. They thus avoid using inactive strains.

They tested the intradermal reaction on 19 patients suffering from undulant fever, proved by agglutination above 1 : 1,000 (in one case to 1 : 6,000) and by haemoculture. As controls they tested it on 72 healthy volunteers, or on patients recovering from diseases other than undulant fever. Three of the latter gave a marked positive and six a weak positive, the remaining 63 a negative. The three positives were cases of tetany and cholecystitis, tuberculous adenitis, and Dercum's disease, all giving a positive tuberculin reaction.

The authors tested the relations between the intradermal reaction and the agglutinating titres in various individuals, including some who had had oral administration of vaccines, and discuss the significance of the agglutination and intradermal reactions which are positive in subjects free from melitensis infection. These points cannot be dealt with in detail here, but the conclusions may be summed up by saying that the intradermal reaction is constantly positive in case of infection by *Br. melitensis*, the instances in which it fails being so few as to be negligible. It is, however, not strictly specific, seeing that it is occasionally present, even if weak, in uninfected individuals. Those who have had vaccines orally or parenterally also react. Some of the apparently uninfected who give a positive may have ingested milk contaminated by *Br. abortus*, and that on more than one occasion, and they would consequently not be exceptions, since they would have undoubtedly have taken the vaccine orally.

H. Harold Scott.

BURNET (Et.). La thermo-agglutination et l'évolution de l'espèce Brucella. [**Thermo-agglutination and the Development of the Brucella Species.**]—*Arch. Inst. Pasteur de Tunis.* 1928. June. Vol. 17. No. 2. pp. 128–146. [10 refs.]

By thermo-agglutination the author implies agglutination by heating an emulsion of the microbes in normal saline in a water bath at 90° C. to 100° C., the time required varying from a few minutes to one or even two hours. This phenomenon specially characterizes the strains known as *para-melitensis* and can be produced in *melitensis* by growing it in contact with *para-melitensis*; once acquired, the property is fixed. This alteration of the physical character of the microbe does not affect its virulence, but may alter the character of the growth in broth, which may show a scum on the surface with stalactite formation resembling a culture of plague; there is no change in the appearance of colonies on agar plates, nothing in the nature of "rough" and "smooth."

The type *para-melitensis*, i.e., thermo-agglutinable cultures, is common being *melitensis* derived from human cases or from goats but rare among *abortus* cultures derived from cases of contagious abortion in cattle.

FAVELLI has already shown that cultures of Brucella can be rendered thermo-agglutinable by the action of immune serum. Burnet repeated these experiments; he succeeded in rendering two strains of *abortus* thermo-agglutinable by this means, and also has rendered *melitensis*

strains thermo-agglutinable by the action of normal serum and also by the action of certain antiseptics, such as formalin, iodoform and iodine. Bile also had the same effect but required very many subcultures; the 20th gave sharp thermo-agglutination both with *abortus* and *melitensis*.

The author then puts the following question: Do the strains which have been rendered thermo-agglutinable in the laboratory possess the same properties as *para-melitensis* found in nature? These properties are that *para-melitensis* is readily agglutinated to 1/150 by normal human serum, and suspensions have a tendency to spontaneous agglutination; they are also bad antigens, i.e., when inoculated into animals such animals only show a low titre of agglutination in their serum, whereas *abortus* and *melitensis* readily produce agglutinins when inoculated into rabbits.

Five strains—4 *melitensis*, 1 *abortus*—were taken; these had been rendered thermo-agglutinable in the laboratory. These strains when inoculated into rabbits (before they had been modified by growth on immune serum) produced a high titre of agglutination, but after modification the four *melitensis* strains no longer did so but no change in this respect had taken place in the *abortus* strain. That is to say, so far as antigenic properties are concerned, the *melitensis* strains after they had been rendered thermo-agglutinable reacted like natural *para-melitensis* strains, whereas *abortus* did not do so; thus *abortus* is seen to be more stable than *melitensis*.

In the opinion of the author the primitive type of Brucella is *abortus*; this is not pathogenic for man directly from cattle, but becomes so after passage through the goat. It is in the goat that Brucella retains its power of producing abortion and attains its power of producing undulant fever.

The author explains the few cases so far reported of undulant fever acquired directly from cattle as being cases of infection of cows by *melitensis* from goats and thence to man. The ordinary course is, as shown graphically, as follows:—

Abortus < *melitensis.* / *para-melitensis.*

Cattle < goats. / man.

D. H.

McAlpine (James G.) & Mickle (Friend Lee). *Bacterium abortus* **Infection in Man. The Results of the Agglutination Test applied to more than 10,000 Human Sera.**—*Amer. Jl. Public Health.* 1928. May. Vol. 18. No. 5. pp. 609–613. [4 refs.] [Storrs Agric. Exper. Station, Storrs, Conn.]

For several years the Storrs Agricultural Experimental Station has tested by agglutination and complement fixation reaction a large number of dairy herds in Connecticut. It appears from the data obtained that 90 per cent. of the herds are harbouring *Br. abortus*. This would suggest that if *Br. abortus* is pathogenic for man there should be many cases of undulant fever in the State. With a view to throwing some light on this subject all sera sent in to the State Department of Health for the Wassermann reaction were tested for agglutination for *Br. abortus*. The antigen employed was made from four strains of *Br. abortus*; 48 hours growths on agar were used and were washed

off in carbolized saline and diluted to scale. This emulsion was mixed with the serum to make final dilutions of 1/25, 1/50, 1/75, and 1/100 and placed in the incubator for 48 hours at 37° C.; one reading was made at this time and a second after the tubes had stood at room temperature for 24 hours.

10,157 human sera were tested; of this number 63, or about 0·6 per cent., gave a complete reaction in all four dilutions. On enquiry it was found that 18 of the persons had partaken of raw milk. In the authors' view it is significant that of 17 females whose sera reacted, 3 had previously suffered from two or more abortions and one was diagnosed as having uterine ulceration.

Although it is true that such sera are not perhaps representative of the general population, yet it would appear from the figures obtained that, so far as this investigation goes, infection with *Br. abortus* is not common in Connecticut State; and this is borne out by the fact that very few cases of undulant fever have been notified.

D. H.

SIMONETTI (F.). [Sur les rapports entre le *Brucella melitensis* et le *Brucella abortus*. Recherches expérimentales.] [**On the Relationship between** *Br. melitensis* **and** *Br. abortus*. **Experimental Research.**]—*L'Igiene Moderna.* 1928. Jan. Vol. 6. p. 9. [Summarized in *Bull. Office Internat. d'Hyg. Publique.* 1928. Apr. Vol. 20. No. 4. p. 615.]

In these researches on the *Br. melitensis* and *Br. abortus* the author employed two strains of each of these two varieties, and studied them from the point of view of agglutination and fixation of complement. Sera for each strain were obtained from guineapigs which had been inoculated subcutaneously with a series of doses of a suspension of the bacteria in saline which had been heated to 60° C. for thirty minutes. The agglutination tests were carried out both with sera unheated and with sera diluted 1/50 in distilled water and heated to 65° C. for half an hour. The complement fixation tests were carried out with the same sera and with the emulsions used to immunize the guineapigs as antigen.

The result of these researches was that, under the conditions employed, it was not possible to make out any difference between the strains of *Br. melitensis* and *Br. abortus*. Epidemiological studies had already demonstrated the connexion between undulant fever and epizootic abortion, and in view of the present work it would appear that the specific agent of the two diseases is one and the same.

D. H.

BROTZU (G.). [Sur les rapports entre le bacille de Bang et le *Micrococcus melitensis*.] [**On the Relationship between** *Br. abortus* **and** *Br. melitensis*.]—*Boll. d. Scienze Med.* 1927. Vol. 5. [Summarized in *Bull. Office Internat. d'Hyg. Publique.* 1928. Apr. Vol. 20. No. 4. p. 616.]

The author cultivated strains of these bacteria from goats (*melitensis* and from cows (*abortus*). He found that when grown on Noguchi's medium (a small portion of guineapig kidney in ascitic fluid with a plug of vaseline) *Br. melitensis* formed a white pellicle just below the vaseline, whereas *Br. abortus* did not or only a rudimentary one. As

regards strains of human origin, some behaved in culture as did *Br. melitensis* (goats) and some resembled *Br. abortus* (cows), the latter being possibly due to bovine infection.

It was noted that if the strains were cultivated for some time in this medium, certain changes took place : for instance, *Br. abortus* ceased to grow on agar and only grew with difficulty in broth.

Br. melitensis also acquired the property of thermo-agglutinability at a temperature of 90° C., a property which has been already shown by BURNET to appertain to *para-melitensis*. It was also noted that after several passages in Noguchi's medium, *Br. melitensis* lost the property of producing a pellicle and thus came to resemble *Br. abortus*. This last observation is in favour of the hypothesis that these two germs are simply varieties of one single kind of bacterium, more or less differentiated by passage through different sorts of animals—goats, cows or man.

D. H.

VERCELLANA (G.). L'azione patogena del b. di Bang per il genero umano è dimostrabile sperimentalmente ? Nota riassuntiva. [**Is** *Brucella abortus* **Pathogenic for Man Experimentally ?**]—*Giorn. di Clin. Med.* 1928. July 20. Vol. 9. No. 10. pp. 545–546. [Inst. Gen. Path., Univ., Parma.]

The author has confirmed by experiment the findings of NICOLLE, BURNET and CONSEIL who, in 1923, obtained negative results from injecting five individuals with cultures of *Br. abortus*. Professor Vercellana inoculated four volunteers with 2,000 million organisms belonging to eight strains isolated from cows in a district where undulant fever is unknown. The virulence of the organisms for animals was proved experimentally on two goats. To other human subjects was given raw milk rich in bacilli from infected goats, also cheese and other food infected with the bacilli. The serum of the various individuals gave a slight agglutination with *Br. abortus* after some days, but there was no sign of any constitutional disturbance in any of them, though they remained under observation for a long period.

H. Harold Scott.

FAVILLI (Giovanni) & BONCINELLI (Umberto). Differente vitalità nelle agar-culture dei batteri della specie " Brucella melitensis." [**Vitality of Agar-Cultures of Organisms of the Brucella Group.**]—*Sperimentale.* 1928. Aug. 1. Vol. 82. No. 5. pp. 371–380. [8 refs.] [Inst. Gen. Path., Univ., Florence.]

What may be designated the " Vitality " test will, if confirmed, help to differentiate *Br. abortus* from the *Br. melitensis* and *para-melitensis*.

The authors put up cultures on agar of 36 strains of Brucella—18 of *Br. abortus*, 10 of *Br. melitensis*, and 8 of *Br. paramelitensis*—and kept them in the dark at room-temperature for two months. Fifteen of the *abortus* strains were from cows in a district free from undulant fever. After this interval they subcultured on to plates twice a month from these original cultures and found that abundant, normal growth was still obtained from all the *abortus* strains up to 3½ months ; after five months two were dead and one gave a poor growth, the remaining fifteen grew abundantly. Of the *melitensis* cultures only three gave

a good growth as long as four months; after 4½ months four gave a weak growth, the rest having died; only one grew at all, and that feebly, after five months. Of the *para melitensis* two gave a good growth and three others a poor one after 3½ months; only one strain lived over 5 months and this yielded but a feeble growth. Protocols are shown with details, from which it appears that *Br. abortus* has a much greater vitality than *Br. melitensis* and that *Br. paramelitensis* has still less.

H. Harold Scott.

CARPENTER (C. M.) & BOAK (Ruth). **Summary of Some** *Brucella abortus* **Studies.**—*Cornell Vet.* 1928. Apr. Vol. 18. No. 2. p. 204. [New York Vet. College, Cornell Univ., Ithaca, N.Y.]

I. Thermal death point of *Br. abortus* in milk.

Human, bovine and porcine strains of *Br. abortus* grown in milk were exposed in bulbs at temperatures of 140°, 142°, 145° and 150° F. for various intervals of time in a carefully controlled water-bath.

The cultures were tested for viability by culture and by guineapig injection; the latter method was found to be the more delicate one. No cultures were viable after 20 minutes exposure to a temperature of 140° F.

II. Examination of Routine Wassermann Serum for *Br. abortus* agglutinins.

3,053 samples of sera were examined; 209 or 6·8 per cent. gave slight or complete agglutination of *Br. abortus* at dilutions varying from 1/15 to 1/1,215. The histories of these patients are being followed up.

D. H.

HUDDLESON (I. Forest) & ABELL (Elizabeth). **Behavior of** *Brucella melitensis* and *abortus* **toward Gentian Violet.**—*Jl. Infect. Dis.* 1928. July. Vol. 43. No. 1. pp. 81–89. [10 refs.] [Michigan State College, East Lansing.]

It has already been noted by one of the authors that the growth of *Br. abortus* is inhibited by gentian violet, and the present paper records further work done with the view of using this property as a means of separation of the various strains of Brucella.

A table records the effects of gentian violet—in dilutions of 1/50,000, 1/100,000 and 1/250,000—on the growth of sixteen strains of *Br. melitensis* derived from various sources, some from human cases and some from goats. None of these strains were inhibited in their growth by the dye in the dilutions used, but a few showed some inhibition by the 1/50,000 dilution.

On the other hand, when twenty-one strains of *Br. abortus*, of bovine origin, were tested with the same dilutions of this dye it was found that whereas one only of the strains was inhibited by a dilution of 1/250,000; a 1/100,000 dilution retarded the growth of all, and a dilution of 1/50,000 completely inhibited the growth of seven strains and retarded the growth of the others.

Thus the authors conclude that the growth-inhibiting action of a 1/50,000 dilution of the dye is nearly sufficient to serve as a means of distinguishing this variety of the genus *Brucella* from the variety *Br. melitensis*.

Twenty-one strains of *Br. abortus* of human origin were then tested and were found to fall into two groups as regards their resistance to the action of gentian violet; one group were very markedly inhibited in their growth by the dye and the other group less so, but still distinguishable from the *melitensis* group and comparable to the *Br. abortus* of bovine origin. The strains in this latter group came from Michigan, California and Rhodesia; none of the strains in Group I came from Michigan.

Twelve strains of *Br. abortus* of porcine origin were tested with the dye and were found to be specially susceptible to its action, even more so than Group I of the series of human origin, and by this means it may be possible to assist in differentiating *Br. abortus* of porcine origin from that of human, although one or two of the strains of human origin and one of bovine were identical with the porcine strains in their susceptibility to the action of the dye.

The authors therefore are of opinion that this action of gentian violet may be of assistance in distinguishing *Br. melitensis* from *Br. abortus* and also in separating the different varieties of the latter.

D. H.

McAlpine (James G.) & Slanetz (Charles A.). **Studies on the Metabolism of the Abortus-Melitensis Group. 4. Effect of Various Concentrations of Carbon Dioxide.**—*Jl. Infect. Dis.* 1928. Sept. Vol. 43. No. 3. pp. 232–240. With 1 chart. [22 refs.] [Storrs Agric. Experim. Station, Storrs, Conn.]

In previous papers the authors have shown that the *abortus-melitensis* group can be divided into two well marked sub-groups by means of the action on glucose. *Br. abortus* of bovine origin cannot ferment this sugar, whereas *Br. abortus* of porcine and human origin and strains of *melitensis* can do so.

The results of the present research show a similar grouping; thus strains of *Br. abortus* of bovine origin require an addition of 5 to 10 per cent. CO_2 for the promotion of luxurious growth, whereas *Br. abortus* of human and porcine origin and strains of *melitensis* are inhibited by low concentrations of this gas. The authors also show that this effect of CO_2 is not due to any alteration in the reaction of the medium.

D. H.

Favilli (Giovanni). Sulla patogenicità del bacillo di Bang per l'uomo.—*Bol. d. Istituto Sieroterap. Milanese.* 1928. Mar. Vol. 7. No. 3. pp. 161–166. [9 refs.] German summary p. 166. [Inst. of Gen. Path., Univ., Florence.]

Jensen (J. P.). Spondylitis e bacillo abortus (Bang).—*Hospitalstidende.* 1928. June 14. Vol. 71. No. 24. pp. 637–646. With 5 text figs. [Copenhagen District Hosp., Frederiksberg.]

Bastai (Pio). Sulla questione della natura della infezione melitense umana di origine ovina e bovina.—*Bol. Istituto Sieroterap. Milanese.* 1928. June. Vol. 7. No. 6. pp. 305–310. [General Med. Clinic, Univ., Turin.]

da Rin (O.) & Weinberger (M.). Studio comparativo del quadro ematologica nelle infezioni sperimentali da Br. bruce e da Br. bang.—*Pathologica.* 1928. July 15. Vol. 20. No. 441. pp. 347–361. [103 refs.]

REVIEWS AND NOTICES.

NÖLLER (W.). Die Züchtung der parasitischen Protozoen. [**The Cultivation of Parasitic Protozoa.**]—*Handbuch der pathogenen Protozoen* (Prowazek). 1928. Bd. III. Lief. 12. pp. (II+) 1815–1967. With 38 text-figs. (Leipzig: J. A. Barth.) [Price Rm. 16.–]

This latest instalment of the late Dr. PROWAZEK's so-called "Manual" contains, in the compass of some 152 pages, a valuable survey of modern methods for the cultivation of parasitic (including some commensal and coprozoic) protozoa. Though mainly a compilation from the relevant literature, it is interspersed with the author's comments, enriched by his own experience, and arranged in accordance with his personal views. A good bibliography of over 26 pages (comprising some 625 entries) shows the range of his reading: while the circumstance that his own name appears in the text more frequently than that of any other worker affords sufficient indication of the personal touch.

Exclusive of the bibliography (Section F), the treatise is divided into five unequal main parts (Sections A–E). Section A—less than 2 pages—is a general introduction, and is followed by section B (pp. 1,818–1,833) which is subdivided into: (1) the cultivation of "parasitic" rhizopods, and (2) the media hitherto used for cultivating these organisms (including the coprozoic amoebae). The information here given is, on the whole, accurate: but it is not quite up-to-date, and does not reveal an extensive first-hand knowledge of the subject, or full appreciation of some of the technical difficulties involved.

Section C (pp. 1,833–1,933) deals with the "parasitic" flagellates, and is divided into two main parts: (I) the cultivation of intestinal forms (12 pages) and (II) the cultivation of blood-flagellates and their next of kin (88 pages). The unequal space allotted to these two different groups exemplifies the author's bias. When dealing with the intestinal flagellates he lists the chief species hitherto cultivated, and gives the formulae for various culture-media which have already been more or less successfully employed. But when he comes to the blood-inhabiting flagellates—with the cultivation of which he is himself intimately familiar—he really lets himself go, and pours out a miscellaneous stream of useful information. All the illustrations belong to this section: and its variegated character can be seen from the headings of the subsections and the order (*sit venia verbo*) in which the several subjects are treated. There are 12 subsections in all, and they comprise: (1) general remarks on the mode of life of blood-flagellates; (2) the history of their cultivation; (3) the constituents of the culture-media suited to the cultivation of such organisms; (4) the physico-chemical conditions necessary for their growth; (5) the technique of making cultures, and the behaviour of the organisms in artificial media; (6) a list of the most important culture-media; (7) the cultivation of the trypanoplasms; (8) the cultivation of the leishmanias and leptomonads of vertebrates; (9) the cultivation of leptomonads from invertebrates and plants; (10) the cultivation of crithidias proper to invertebrates; (11) the cultivation of trypanosomes from the blood of vertebrates, and of their developmental forms from invertebrate vectors; (12) "the culture-media for blood-flagellates and their kin (preparation, inoculation, maintenance)." The author's methods of making plate-cultures of trypanosomes (and allied forms) on blood-agar are here described in minute detail: while the accompanying illustrations even show such objects as Petri dishes and Bunsen burners and a platinum loop (unfortunately invisible in the half-tone reproduction), and indicate—beyond all reasonable misunderstanding—exactly how a blood-agar plate may be inoculated upside-down (fig. 32). To anyone wholly ignorant of bacteriological and protozoological technique, such particulars should prove invaluable.

Section D (pp. 1933–1937) deals with methods for cultivating the "Coccidia and Haemosporidia," and section E (pp. 1938–1940) summarizes (not too fully) what is now known about the cultivation of "parasitic Infusoria."

The author takes throughout—when his own claims to priority are not concerned—a liberal view of the alleged achievements of others; and accordingly he sometimes accepts and quotes methods and media which are not yet generally approved. In his opinion, all experienced workers recognize that a method of cultivation may succeed with one investigator, though it invariably fail in all other equally competent hands. Consequently, he records—to give examples—LYNCH's method (1915) of cultivating *Trichomonas*, and CUTLER's methods (1918) for *Entamoeba histolytica*: and he rebukes more critical workers (especially the reviewer) who, after repeated trial, have satisfied themselves that *T. hominis* cannot usually be cultivated in broth acidified with acetic acid, and that *E. histolytica* is uncultivable in a watery extract of human blood-clot incubated at 28°–30° C. The reviewer—having no axe to grind—is content to let time decide whether the liberal or the conservative interpretation of these and various other similar claims be scientifically the sounder. He merely wonders mildly now why numerous earlier "successes" are not treated by the author with equal respect—why, for instance, there is no mention of the achievements of those who once "succeeded" in cultivating *E. histolytica* in hay-infusion and on ordinary nutrient agar at room-temperature? If the author's standpoint be taken, one must believe that this parasite was cultivated by various irrational and apparently impossible methods long before BOECK and DRBOHLAV attained their unquestionable success in 1924.

A few other minor points deserve critical notice. For example, the author's views on nomenclature are not always easy to understand. He calls the trichomonad of the human intestine by the novel name of "*Trichomonas intestinalis* DAVAINE 1860" (p. 1834), though whether by misprint, mistake, or design, is not manifest: while he designates (p. 1882) the herpetomonad of the house-fly "*Herpetomonas muscae domesticae* STEIN 1878," with synonym "*H. muscarum* (LEIDY 1856) KENT 1881"—a truly remarkable addition to the nomenclature of this unfortunate flagellate. Acceptance (p. 1837) of the specific name "*macropi*" (for the *Trichomonas* of *Macropus*) is surely to be deprecated. One can well understand how so strange a genitive case might be used by a Japanese, but it is hard to conceive how anyone of European education could copy him. On p. 1840, under "*Embadomonas spec. var.*" (which appears to mean "*species variae*," though *spec.* and *var.* are the accepted biological abbreviations for *species* and *varietas*), the author rather hypercritically queries the species of organism described by WENYON as "an English frog." The description was not, perhaps, the best possible; but as there is only one native English species, the indication is not altogether unintelligible. It may also be noted that several hitherto unpublished observations by NIESCHULZ are incidentally recorded, and that the author occasionally dates his own methods not from their date of publication, but from the time when he first conceived them (e.g., on p. 1933 we find "Nöller's serum-agar 1916, published 1922"). On p. 1879, moreover, a "new species" of *Leptomonas* is instituted—albeit in circumstances of some dubiety. It is a pity that writers of text-books and similar works cannot avoid proposing such new species incidentally, as this practice invariably leads to trouble.

Despite these and other minor blemishes, however, this perspicaciously annotated compilation will be of real value to all engaged in research involving the cultivation of parasitic and commensal protozoa: for it has been made with evident care, and it is throughout commendably free from misprints and misquotations; while the instructions given for the cultivation of blood-inhabiting protozoa are probably better and more complete than any yet published, and therefore deserve the attention of all serious students of this difficult subject.

Clifford Dobell.

[The reviewer cannot refrain from seizing this opportunity to enter a protest against the manner of publication of the "*Handbuch*" of which the present memoir forms a serial part. This work began—professedly—as a compendium of the pathogenic protozoa in 1912, and subscribers were then led to expect that it would be quickly completed in two volumes at a moderate price. But the work has long since ceased to be a "manual"—in any sense—and has become a periodical. The original editor (and part-author) died 13 years ago: many subjects have already been treated several times, by different hands: and a large proportion of the space has been devoted to "Chlamydozoa" and to the Spirochaetes and other organisms which—as the present editor himself confesses—are not protozoa at all. Vol. I (514 pages) cost originally about 28 shillings, and is now out of print: Vol. II (524 pages) now costs about £2. Vol. III—which subscribers did not originally bargain for, and which is not yet finished—has already covered nearly 1,000 additional pages at a present cost of roughly £3. (During issue it has been variously priced by the publishers at anything from 58 to 200 marks.) The publishers now announce that a final section, with the much-needed index, will appear shortly. They first made this announcement in 1914—since when the work has been doubled in size and cost— and have repeated it before the issue of each subsequent instalment. Without its index the "book" is almost unusable, as some articles are duplicated or even triplicated and subjects follow one another in no recognizable order through some 2,000 pages. Each time a new instalment appears, subscribers are thus faced with the option of buying yet one more part—with the gradually receding hope of getting the index, and completing the work—or of ceasing to buy new parts and so being saddled with a fragment of a book whose cost is not commensurate with its present-day protozoological value. Every year brings new results, and consequently many of the articles now possess little but historical interest; and there is thus no obvious reason why this publication—by continued repetition, revision, supplement, and still further extension of its purview—should not go on for ever. It is greatly to be hoped, therefore, that the publishers will this time keep their promise—first made 14 years ago—to finish off this "handbook" and supply subscribers with the long-overdue and indispensable index to its disorderly and heterogeneous contents.—C. D.]

ACTON (Hugh W.) [Lt.-Col., I.M.S., Professor of Pathology & Bacteriology, Calcutta School of Tropical Medicine & Hygiene.] & KNOWLES (R.) [Lt.-Col., I.M.S., Professor of Protozoology, Calcutta School of Tropical Medicine & Hygiene.] **On the Dysenteries of India. With a Chapter on Secondary Streptococcal Infections and Sprue.**—pp. xiv+178. With 5 colour plates & 33 figs. 1928. Calcutta: Thacker, Spink & Co. [Rs. 7/8.]

In this book the dysenteries of India receive complete survey, critical analysis and excellent illustration. The ascertained facts concerning them which must be known to, and acted on, by clinician and sanitarian if competence in their work is their aim, are lucidly recorded and discussed by two authors who have valid claims to be heard on the subject. They note that the advance in knowledge of dysentery which resulted from the war and post-war years has not yet been generally incorporated in the teaching of medicine in India. The erroneous belief that most of the dysentery of India is amoebic is still widely held there; we would add, generally held, and as erroneously, for the dysentery in most of the tropics outside India.

The authors themselves have taken the leading part in correcting this error in India. They frankly emphasize that this book is a compilation—a "piracy"—taken chiefly from the work of MANSON-BAHR, Marrian PERRY, DOBELL, LOW, FLETCHER, JEPPS, HARVEY. But it may be that their own knowledge gained in original research on the dysenteries of India

while endowing them with trustworthy ability to select from and thus endorse the original work of others, also entitles them to express their views in any comprehensive treatise on the subject, such as this book is. They point out that all the work on dysentery in India (that country's third most important cause of mortality) has been done by individual and isolated workers—Timothy LEWIS, and D. D. CUNNINGHAM, in earlier days; and more recently, Leonard ROGERS (to whom this book is dedicated): a select band, to whom we may now join Acton and Knowles. They note, however, with surprise and perhaps some hint of regret that the dysenteries of India have not yet been the subject of an "organized research commission." We may be sure that the only organized research commission tolerable to original workers is one in which an individual original worker, isolated by his own compelling idea of what he wants to do, is given all the skilled obedient assistance, and ready access to material, he may require. He is not to be hampered by other minds, but helped with more hands and then let alone. In fact, however, most commissions have but found again, and repeated with a thicker utterance, the discoveries and conclusions of individual and isolated workers.

Once upon a time the word "Mesopotamia" gave comfort. Now, in medicine, we have got the word "Commission"; and it is still not clear that its blessing is much less futile than that of the older word. Meanwhile the authors' work has done much to make the task of the Commission (which may be upon India any day) an easy one. Their book has a wider appeal and usefulness than in India only.

H. M. Hanschell.

BOLETÍN DEL INSTITUTO DE CLÍNICA QUIRÚRGICA. Buenos Aires. 1928. Vol. 4. Nos. 28–31. 970 pp. With numerous illustrations. [Also issued as *4a Reunión Soc. Argentina Patología Regional del Norte Santiago del Estero 7, 8 y 9 Mayo 1928.* 970 pp. With numerous illustrations.]

In dealing with a work of this size, nearly 1,000 pages and 120 collected papers, it is not possible to do more than mention some of the most important. The plates are excellent, the illustrations generally of a high standard and the print clear; the binding may be regarded, according to the reader's view, as villainous or non-existent, which, though a common fault in foreign publications of the present day, is a pity in this instance where the majority of the contents are of interest to some branch or other of science.

To speak in more detail of some of the matters of particular importance to tropical workers.

Attempts at reproducing leprosy experimentally in a monkey were made by Professor FRANCHINI. It is true that lesions were produced by supra-orbital inoculation of a leproma rich in bacilli into a *Macacus sinicus* but no generalization took place; on the contrary spontaneous cure resulted in a comparatively short time, two months or less. MARQUEZ DA CUNHA has an article on Verruga peruviana which gives a good review of the subject but brings forward no new facts. In the second section of the book the subject of malaria is dealt with. Of the 23 papers in this part several are of local interest only and do not call for comment; others may be referred to here. Drs. RICKARD, QUIETA and NÚÑEZ, having noticed that no anopheline larvae were to be seen in the canals conveying the products from the crushing mills of sugar factories, undertook experiments to determine whether any of the constituents were particularly larvicidal and, if so, whether they could not be so used more generally. Fusel oil, molasses extracts, and other products were tested, but for larvicidal action the proportion of extract needed was so high that commercially its use would be out of the question. An interesting series of experiments was carried out by Dr. Antonio BARBIERI as to the larvicidal action of fluorescent

substances under the action of sunlight, that is the photodynamic action of light as a larvicide. He tried many preparations, several of which were active. The best appeared to be Bengal Red which in a dilution of 1 : 500,000, or even in some cases 1 : 1,000,000, led to the destruction of the larvae when exposed to sunlight for four hours. If the sky was clouded the time for effective action was considerably prolonged.

Drs. MERZBACHER and BIANCHI contribute two papers. The first is a consideration of the replies to a series of questions sent to 400 medical men as to the effects of paludism on syphilitic diseases. They were generally to the effect that " the evolution of syphilis was favourably modified." Not too much reliance can be placed on such a general statement as the question depends on so many factors—the prevalence of the two diseases, the stage of the syphilis and, above all, the personal factor of the doctor and the treatment he adopts. The second is an account of the authors' own experience regarding the effect of malaria on nervous forms of syphilis. They find that syphilis uncomplicated by malaria gives twice as many positive Wassermann reactions as it does when associated, and that the colloidal reaction with the cerebrospinal fluid is profoundly modified. The inference to be drawn is that the results of these tests must be cautiously interpreted in malarious districts.

Dr. CAPELLE relates four cases of malaria, three of *P. vivax* and one of *P. malariae*, treated with plasmoquin, three with success ; in the fourth, a child a little over a year old, the malarial parasites seemed to disappear but the general state did not improve and this is ascribed to inherited syphilis. Dr. MAZZA writes on the action of the same drug on Haemoproteus and finds it most successful on these gametocytes and also on avian trypanosomes. Other quinine substitutes in malaria were tried. Urotropine (which OLIVERA had reported as being most effectual) was given by Dr. J. D. LUNA to 47 patients, four of them quartan, the rest "tertian." Ten cc. of Schering's solution were injected daily for 8–12 days but proved in the author's hands to be ineffective. The parasites were possibly reduced in number in some cases, but the attacks of fever were uninfluenced. Drs. MAZZA and TRELLES employed the bark of *Aspidosperma quebracho blanco*, var. *pendula* in tablets with marked success in a certain number of patients ; others did not react and to them quinine had to be given. It might be useful in some who are intolerant to the latter. The dose employed was six tablets daily for 5 days with a repetition of the course after an interval of the same duration. Dr. RAIMONDI mentions a case of malarial psychosis, melancholia with delusions, associated with quartan parasites, which cleared up on administration of quinine. One case of urticaria and four of purpura with malaria also reacted well and promptly to quinine. Drs. R. COSSIO and A. A. ALBARRACIN tested the rate of sedimentation of erythrocytes in 29 cases of malaria and found it increased while the patients were undergoing treatment with quinine.

Section III, on *Dysentery and Diarrhoeic conditions*, contains little of importance. One case of diarrhoea associated with the presence of *Trichomonas hominis* in very large numbers cleared up when given Yatren.

In Section IV, on *Leishmanial affections*, Drs. MAZZA and BERNASCONI contribute a paper on leishmaniasis complicated by invasion of the pharynx and, more particularly, the larynx ; the paper is illustrated by good photographs and microphotographs demonstrating the pathology of the condition. All proved very resistant to treatment with tartar emetic. In this connexion mention must be made of a case described by Dr. BORZONE of a woman with cutaneous leishmaniasis of the right forearm with enlarged axillary glands and spleen. In smears made from the latter two situations Leishmania were present in large numbers, " metastasis by the parasite blocking the reticulo-endothelial system." The haemohistioblasts in the spleen smear showed them in abundance. The author mentions that he has frequently seen cases of American cutaneous leishmaniasis, *Leishmania brasiliensis*, with mutilating lesions of the face, the buccal cavity, the oesophagus and the larynx.

In the section on *Ophthalmology* there are two papers, one on Trachoma, the other on a tumour (plasmacytoma) of the conjunctiva and cornea, neither of which is of special interest to readers of the *Bulletin*, though of value pathologically.

In the sixth section, devoted to *Infective Diseases*, there are two papers on pulmonary and bronchial spirochaetosis. These are dealt with in greater detail under the appropriate sections of the *Bulletin*. Another relates severe corneal complications occurring in measles, in particular hypopyon, infiltration, and ulceration. Five cases are detailed and since they all occurred in the hot months the author, Dr. R. G. OLLE, believes that the climate causes an exaltation of the virulence of the causative organisms [whatever they may be] aided by faulty hygiene and the precarious mode of life of the people.

In the *Haematological* section (VII) is a paper of medico-legal interest regarding the blood-grouping of parents and children for the determination of paternity, and showing its limitations. Dr. MAZZA and BIANCHI made a comparative study of the blood of persons at a height of 1,200 metres above sealevel and the same at 3,500 metres. Their results confirm those already given by BARCROFT.

Several papers are included on the *Mycological* infections of South America which are of special interest to systematists rather than to clinicians. Four of these deal with Monilia and Blastomycotic infections of the respiratory tract. Several papers are comprised in the section on *Parasitology*. Nearly all these deal with descriptions of parasites, protozoal and helminthological, found in animals, reptiles, birds and some of the lower mammals. Apart from these, a paper by F. L. NIÑO on the "Morphological Aspects of *Schizotrypanum cruzi* in the Body of its Hosts and in Culture Media" is illustrated by some beautifully executed coloured plates.

A case is recorded of Spider-bite which terminated fatally in an infant of 8 months. When seen on the fifth day after infliction of the injury, the site of the bite, the palm of the hand, presented a large necrotic ulcer, but without any haemorrhage or purulent discharge. There was no lymphangitis, but the constitutional disturbance was great—fever (29·3° C), tachycardia (155), and dyspnoea (50), vomiting of bilious matter, passage of bile-stained urine. The pupils were inactive to light and convergence; groups of muscles were involved in spasmodic but rhythmic movements, most marked on the side of the lesion. There was some generalized lividity and oedema which increased (Aguilar's "white necrosis"), a sign of bad augury. In spite of treatment the ulcer extended in size and depth and death occurred in coma on the fifteenth day. The poison was clearly cytolytic, necrotizing, and neurotropic. The species of spider responsible was not discovered.

The remaining sections, namely those on pharmacology, materia medica, medical statistics and climatology, and American medical history, ethnography and anthropology, do not call for comment.

H. Harold Scott.

MARCHIAFAVA (Ettore). La perniciosità nella malaria. Monografie Medico-Chirurgiche d'Attualita Collezione del "Policlinico." [**Perniciousness in Malaria.**]—66 pp. With 3 graphs in text & 21 figs. on 1 plate. 1928. Roma: Casa Editrice Luigi Pozzi. [L.12.]

In this monograph, issued by the *Policlinico*, Marchiafava states his belief in the plurality of plasmodial species and of their endocorpuscular site. Perniciousness is for all practical purposes an attribute of *P. falciparum* and its morphology, sporing sometimes without pigment formation; its sexual cycle and phagocytosis are dealt with. The clinical aspects of the febrile curve and general state are clearly shown. Perniciousness is attributed to freer multiplication and greater toxicity than with the other species; and its various forms—nervous, anginoid, syncopal, haemorrhagic, choleraic, dysenteric, scarlatinoid and haemoglobinuric—come under

survey, as well as the rare "larval" forms in which fever is absent. An indication of approaching perniciousness is found in abundant subtertian rings in the cutaneous blood. After effects of perniciousness are intense anaemia and grave residual nervous symptoms, implicating brain, bulb, cord and nerves. Diagnosis and prognosis are considered and satisfying sections follow dealing with pathological anatomy, prophylaxis and treatment. A plate of figures accompanies the book, remarkable for its economy of detail and striking clearness. The monograph puts into compact form the valuable life-long experience of a master of malariology.

Clayton Lane.

MARTINI (Erich). Beiträge zur medizinischen Entomologie und zur Malaria-Epidemiologie des unteren Wolgagebiets. [**Contributions to Medical Entomology and to Malaria Epidemiology of the Lower Volga.**]—*Abhandl. a. d. Gebiet d. Auslandskunde Hamburg. Univ.* 1928. Vol. 29. (D., Med. & Vet. Vol. 3.) pp. xi+134. With 21 text figs., 42 figs. on 14 plates and 3 maps. 1928. Hamburg: Friederichsen, de Gruyter & Co. m. b. H. [M.12.]

The author visited the lower course of the River Volga, and describes the country through which it flows, and some of the characteristics of the climate. He passes on to a systematic account of the mosquitoes and other biting flies which he met, and it is clear that he devoted great attention to these insects; the species of *Aëdes* which breed in the wet meadows and in salt pools in the steppes must be a very grave pest in summer. The second half of the book deals in further detail with the biology of the species of *Anopheles*, their relation to malaria, and the great epidemics of that disease which occurred in 1922 to 1924.

The climate is dealt with, but the facts quoted were not originally collected with reference to the present inquiry. One would like to know what difference in climate exists between the hilly west bank and the grassy meadows to the east of the Volga; we should like a number of facts about the temperature of marsh water, and the annual cycle of humidity in a cowshed. It is topics of this sort which are really relevant. But the author is content to give us the generalizations of meteorology, and small-scale maps showing mean isohyets and isotherms sweeping across the whole of Eastern Europe in a familiar (and rather conventional) manner. For these deficiencies he cannot be blamed; he has given us the best he could in the present state of human ignorance. The blame rests on every entomologist who is content to swallow meteorological summaries, and forgets that few of the insects live in a white ventilated screen, and that small local differences in climate are large enough to affect fauna and flora.

Measured in terms of entomology, the problem of malaria on the lower Volga was simple, for only two species of Anopheles occurred, *maculipennis* and *bifurcatus*; the first of these was thought to be the important vector. It is fortunate indeed for the inhabitants of the Volga region that they live a trifle to the north of the range of that dangerous species *A. superpictus*, which would otherwise make its home in the little streams that run down the hilly west bank of the river. The post-war epidemics of malaria are discussed, and the available data examined. It appears that a very great increase of malaria occurred in 1922 and the two following years, and that this was due to hunger and economic factors rather than to climatic factors or increase in the number of Anopheles. But it seems that the epidemiological facts for different years are not really comparable, and that they will not stand rigorous examination.

The reviewer has failed to discover the date of Professor Martini's visit to the Volga or how long he spent in the country, or how widely he travelled in it. His illustrations are good.

P. A. Buxton.

BUCHANAN (R. E.) [Ph.D., Dean of the Graduate School, Professor of Bacteriology & Bacteriologist of the Iowa Agricultural Experiment Station, Iowa State College] & FULMER (Ellis I.) [Ph.D., Professor of Biophysical Chemistry, Department of Chemistry, Iowa State College]. **Physiology and Biochemistry of Bacteria. Volume I.—Growth Phases; Composition and Biophysical Chemistry of Bacteria and their Environment; and Energetics.**—pp. xi+516. With 78 text figs. 1928. London: Baillière, Tindall & Cox, 8, Henrietta Street, Covent Garden, W.C. 2. [34s.] [Review appears also in *Bulletin of Hygiene.*]

Recent years have witnessed a notable output of books dealing with various aspects of bacteriology, some of them covering, or attempting to cover, the whole ground of the subject, after the fashion of an ordinary text-book, some of them having the nature of a monograph, or a collection of monographs. The present volume occupies an intermediate position. It is the first volume of a text-book dealing with the physiology of bacteria, their properties and activities as living things, and especially with those aspects of their behaviour which are susceptible of study by the more exact methods which physics and chemistry have introduced into biological science. Indeed, it would be true to say that the present volume tells us a good deal about physics, rather less about chemistry, and relatively little about bacteria; but that is only because the application of such methods to the study of micro-organisms is in its infancy, and a book which points the way to an unexplored country may be more valuable than one which provides a description of a well-charted territory.

The authors have been at pains to indicate clearly the kinds of methods which may be used to measure growth-rates and death-rates in bacteria, their metabolic processes, their physical properties when in suspension, and their energy exchanges. The principles which underlie these methods are discussed in some detail; and a free use of graphs will be welcomed by those who realize, too late, the inadequacy of their mathematical training. Some useful monograms are included, and there is an excellent bibliography.

This volume and its implied successors will, we believe, be welcomed by all teachers of bacteriology, The information which it contains is, at present, scattered in various text-books, and throughout a large number of scientific journals; and it has been very difficult to indicate to students where they should look for information on these particular aspects of their subject. The collection of the relevant facts in a single book fills a real gap in bacteriological literature.

W. W. C. Topley.

SANDU (Damodar Vasudeo). [G.P.A.C. (Bom.), L.M.S. (Homeo), etc.] **Indian Therapeutics. Dealing with the Comparative Diagnosis, Ayurvedic Materia Medica, Dietetics, Prescriptions, etc., for Students and Practitioners.** 2nd Edition. Revised and Enlarged.—pp. vii +147. 1928. D.K. Sandu Bros. Chembur, Bombay.

The famous Dean Hole was once asked to give his opinion of a certain book. His reply was: "If it is the kind of book you like you will like it"; and no doubt the strict followers of the Ayurvedic system of medicine will derive comfort and information from "Indian Therapeutics." The system of diagnosis in Ayurved is described at length with details of the principles upon which the system is founded. It is stated that the ancient Rishis were acquainted with the endocrine glands and their secretions. The main portion of the book is a catalogue of diseases, symptoms, drugs, prescriptions and doses. Under the chapter on "Vehicles" we find: "Ascites—cow's urine"; "Gout—cow's urine, castor oil." There is a table of the vitamin content of various foods and an obstetric calendar. The printing is not very good and there are too many errors in spelling.

J. H. Tull Walsh.